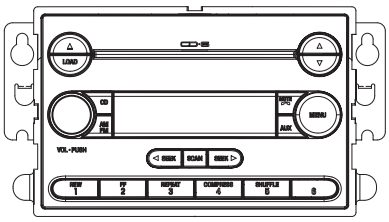
Pioneer sound.vision.soul

Service Manual

FORD



DEH-MG2047ZF/XU/UC

ORDER NO.
CRT3266

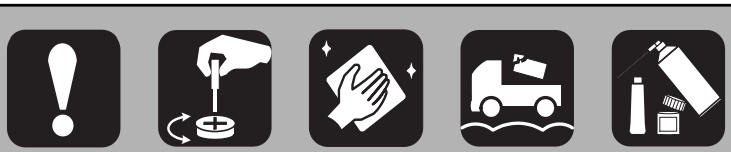
6 DISC IN-DASH CD CHANGER WITH FM/AM TUNER

DEH-MG2047ZF/XU/UC

VEHICLE	DESTINATION	PRODUCED AFTER	OEM PARTS No.	ID No.	PIONEER MODEL No.
F-250, F-350	U.S.A., CANADA	July 2004	5C3T-18C815-AG	-	DEH-MG2047ZF/XU/UC

This service manual should be used together with the following manual(s):

Model No.	Order No.	Mech.Module	Remarks
CX-951	CRT2872	G2	CD Mech. Module:Circuit Description, Mech. Description, Disassembly



For details, refer to "Important symbols for good services".

PIONEER CORPORATION 4-1, Meguro 1-chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O. Box 1760, Long Beach, CA 90801-1760, U.S.A.
PIONEER EUROPE NV Haven 1087, Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE. LTD. 253 Alexandra Road, #04-01, Singapore 159936

K-ZZW. MAY 2004 printed in Japan

SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

● Service Precaution

1. You should conform to the regulations governing the product (safety, radio and noise, and other regulations), and should keep the safety during servicing by following the safety instructions described in this manual.
2. Before disassembling the unit, be sure to turn off the power. Unplugging and plugging the connectors during power-on mode may damage the ICs inside the unit.
3. To protect the pickup unit from electrostatic discharge during servicing, take an appropriate treatment (shorting-solder) by referring to "the DISASSEMBLY" on page 63.
4. After replacing the pickup unit, be sure to check the grating. (See page 57.)

[Important symbols for good services]
In this manual, the symbols shown-below indicate that adjustments, settings or cleaning should be made securely.
When you find the procedures bearing any of the symbols, be sure to fulfill them:

1. Product safety

You should conform to the regulations governing the product (safety, radio and noise, and other regulations), and should keep the safety during servicing by following the safety instructions described in this manual.

2. Adjustments

To keep the original performances of the product, optimum adjustments or specification confirmation is indispensable. In accordance with the procedures or instructions described in this manual, adjustments should be performed.

3. Cleaning

For optical pickups, tape-deck heads, lenses and mirrors used in projection monitors, and other parts requiring cleaning, proper cleaning should be performed to restore their performances.

4. Shipping mode and shipping screws

To protect the product from damages or failures that may be caused during transit, the shipping mode should be set or the shipping screws should be installed before shipping out in accordance with this manual, if necessary.

5. Lubricants, glues, and replacement parts

Appropriately applying grease or glue can maintain the product performances. But improper lubrication or applying glue may lead to failures or troubles in the product. By following the instructions in this manual, be sure to apply the prescribed grease or glue to proper portions by the appropriate amount.For replacement parts or tools, the prescribed ones should be used.

COMPACT disc DIGITAL AUDIO

CONTENTS

1. SPECIFICATIONS

General

Power source ..... 14.4V DC(14.2V-14.6V allowable)
Grounding system ..... Negative type
Backup current ..... 3mA or less
Dimensions ..... 198(W) x 130(H) x 202(D)mm
Weight 2.7kg

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency : 44.1kHz
Number of quantization : 16;linear
S/N ..... 70dB or more
Distortion ..... 0.2% or less

FM tuner

Frequency ..... 87.75-107.9 MHz
Distortion ..... 1.5% or less
IF interference ..... 120dB or more
Image interference ..... 50dB or more

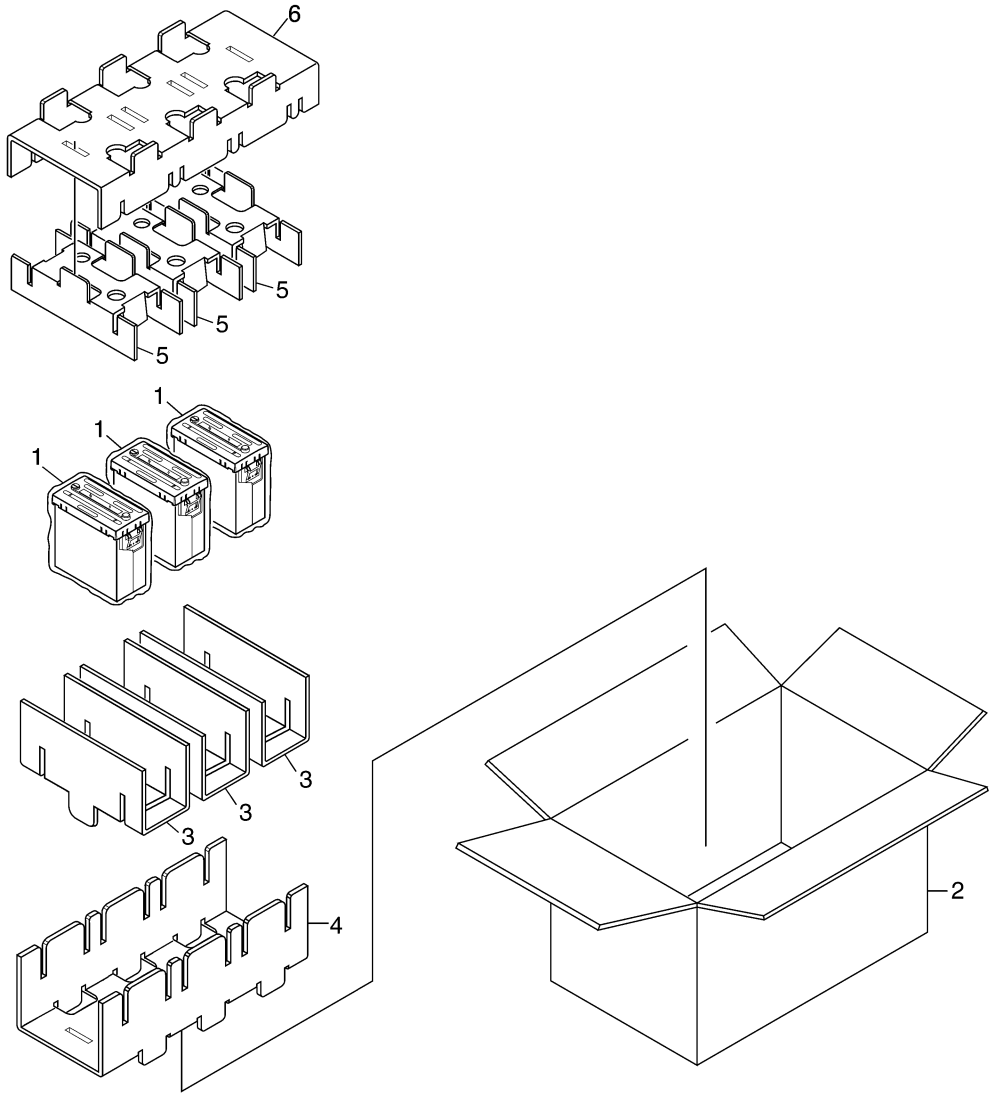
AM tuner

Frequency ..... 530-1710 kHz
S/N 20dB useable sensibility ..... 28dBμ±6dBμ
S/N ..... 54dB ±5dB
Distortion ..... 2.0% or less
IF interference ..... 75dB or more
Image interference ..... 60dB or more

2. EXPLODED VIEWS AND PARTS LIST

*NOTES : • Parts marked by " * " are generally unavailable because they are not in our Master Spare Parts List.*
• Screw adjacent to ▽ mark on the product are used for disassembly.
• For the applying amount of lobricants or glue, follow the instructions in this manual.
(In the case of no amount instructions,apply as you think it appropriate.)

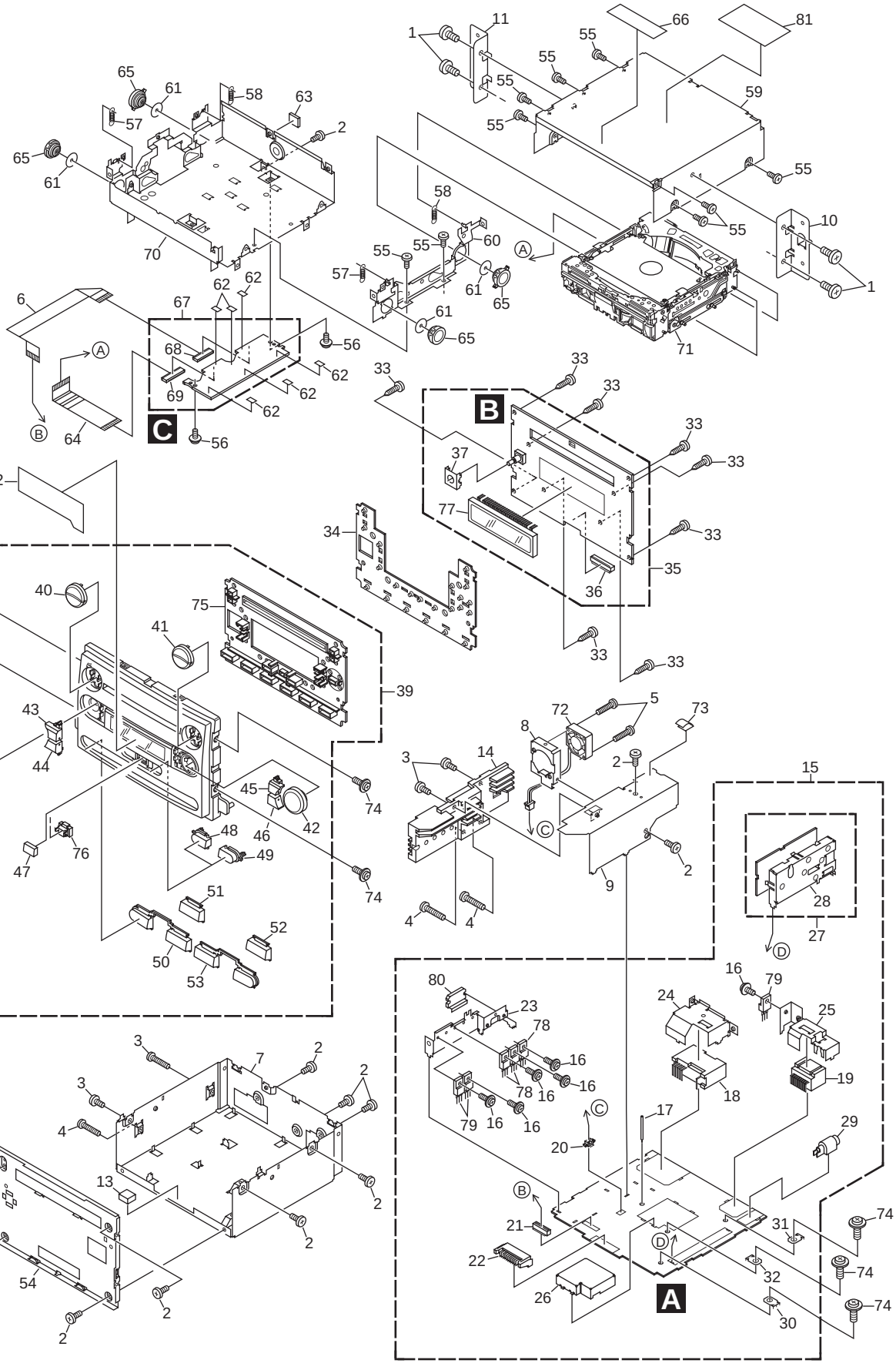
2.1 PACKING



PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
*	1	Polyethylene Bag	CEG1317
	2	Contain Box	CHL5150
	3	Protector	CHP2755
	4	Protector	CHP2756
	5	Protector	CHP2753
	6	Protector	CHP2754

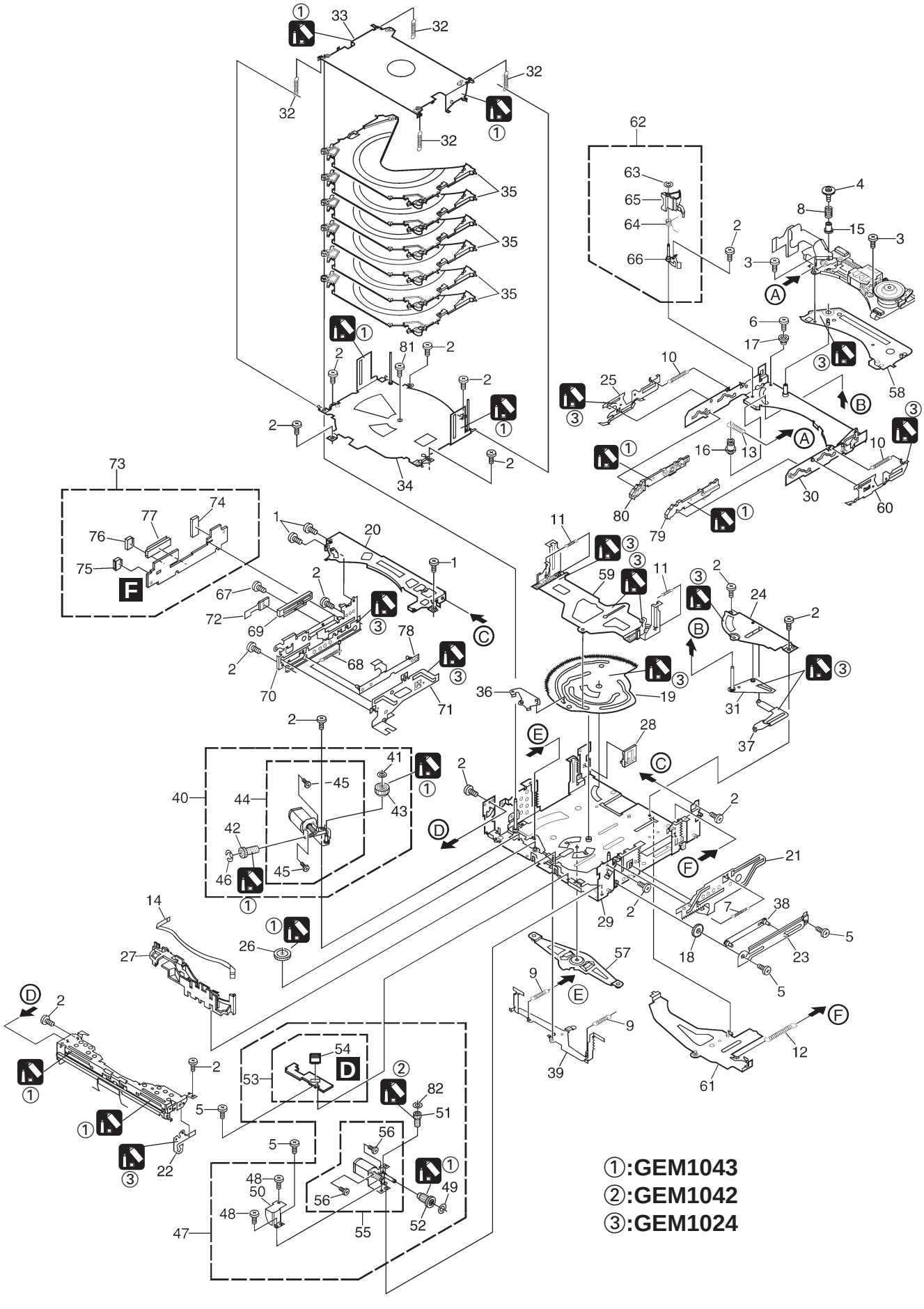
2.2 EXTERIOR



EXTERIOR SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Screw	BMZ50P080FTC
	2	Screw	BSZ26P060FTC
	3	Screw	BSZ26P080FTC
	4	Screw	BSZ26P180FTC
	5	Screw(M2.6x14)	CBA1632
	6	Connector	CDE7271
	7	Chassis	CNA2626
	8	Holder	CND1497
	9	Holder	CND1503
	10	Bracket	CND2180
	11	Bracket	CND2181
	12	Sheet	CNM8524
	13	Cushion	CNM8664
	14	Heat Sink	CNR1689
	15	Tuner Amp Unit	CWM8869
	16	Screw	ASZ26P080FTC
	17	Clamper	CEF1035
	18	Connector(CN722)	CKM1455
	19	Plug(CN721)	CKM1384
	20	Connector(CN723)	CKS3124
	21	Connector(CN725)	CKS3859
	22	Connector(CN724)	CKS4575
	23	Holder	CND1498
	24	Holder	CND1499
	25	Holder	CND1500
	26	Shield	CND1736
	27	FM/AM Tuner Unit	CWE1774
	28	Holder	CNC8855
	29	Antenna(CN726)	HKX1054
	30	Terminal(CN301)	VNF1084
	31	Terminal(CN401)	VNF1084
	32	Terminal(CN402)	VNF1084
	33	Screw	BPZ26P100FTC
	34	Rubber	CNV7580
	35	Keyboard Unit	CWM8873
	36	Connector(CN951)	CKS4576
	37	Holder	CND1587
	38	Knob Unit	CXC3405
	39	Grille Unit	CXC3624
	40	Button(EJECT/LOAD)	CAC7973
	41	Button(UP/DOWN)	CAC7974
	42	Button(MENU)	CAC7975
	43	Button(CD)	CAC7976
	44	Button(AM/FM)	CAC7977
	45	Button(MUTE)	CAC7978
	46	Button(AUX)	CAC7979
	47	Button(SCAN)	CAC7980
	48	Button(< SEEK)	CAC7981
	49	Button(SEEK >)	CAC7982
	50	Button(1,3)	CAC7983
	51	Button(2)	CAC7984
	52	Button(5)	CAC7985
	53	Button(4,6)	CAC7986
	54	Holder Unit	CXC3509
	55	Screw	BSZ26P060FTC
	56	Screw(M2x2.5)	CBA1624
	57	Spring(Silver)	CBH2481
	58	Spring(Black)	CBH2482
	59	Case	CNB2848
	60	Bracket	CND1501
	61	Sheet	CNM5981
	62	Cushion	CNM8525
	63	Cushion	CNM8663
	64	Flexible PCB	CNP7267
	65	Damper	CNV6608
	66	Label	CRW1467
	67	Control Unit(G2F)	CWX2835
	68	Connector(CN601)	CKS1956
	69	Connector(CN101)	CKS4512
	70	Chassis Unit	CXC1192
	71	Service Mechanism Assy(G2B)	CXX1661
	72	Fan Motor	CXM1268
	73	Stick Finger	DNB1092
	74	Screw	ISS26P060FTC
*	75	Housing	CNV7578
*	76	Housing	CNV7579
	77	VF(V951)	CAW1806
	78	Transistor(Q805,817,818)	2SD2375
	79	Transistor(Q809,814,824)	2SB1185
	80	IC(IC101)	TDA7384
*	81	Label	CRW1507

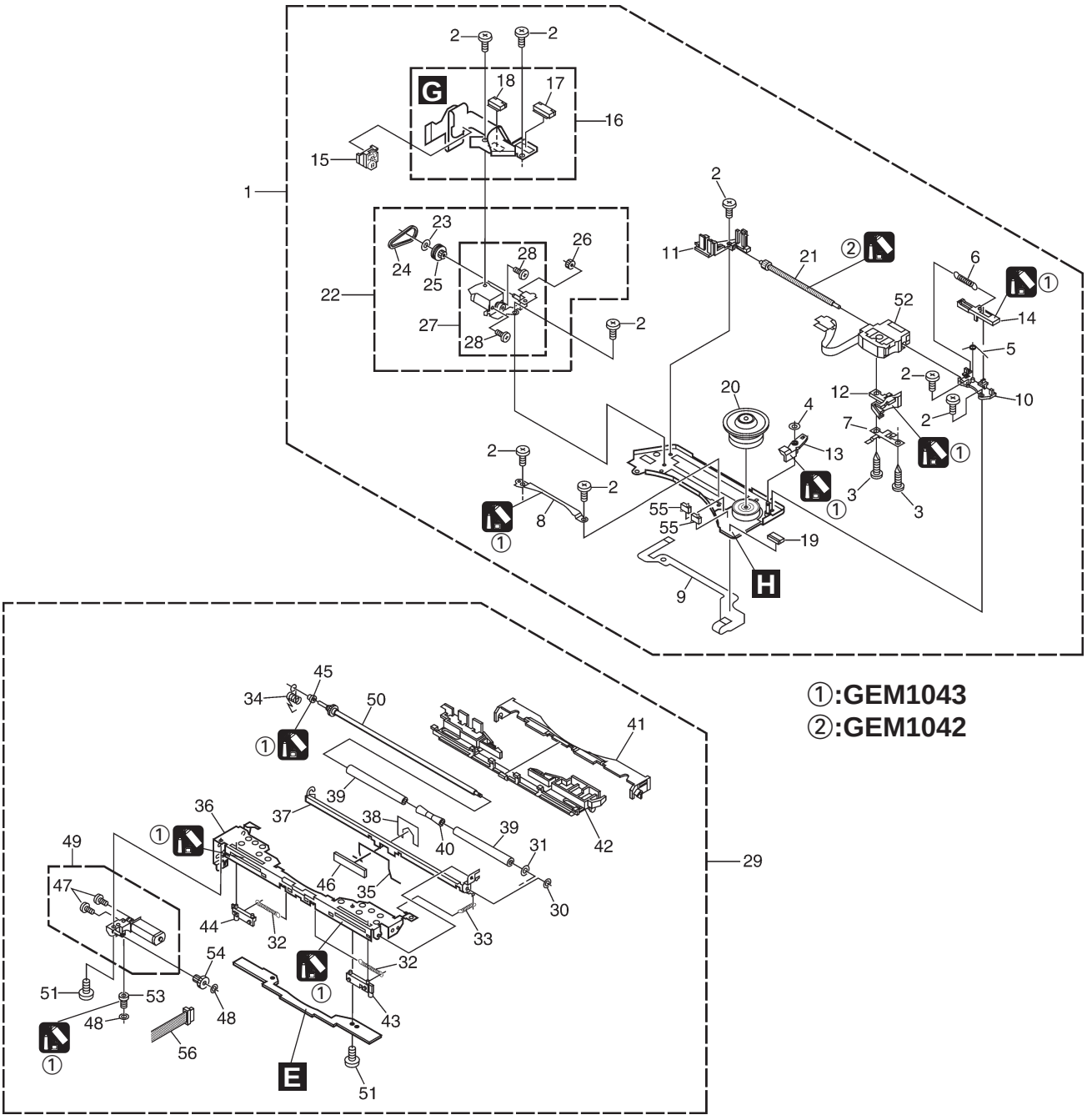
2.3 MECHANISM ASSY(G2B)(SERVICE)(1)



MECHANISM ASSY(G2B)(SERVICE)(1) PARTS LIST

Mark	No.	Description	Part No.
	1	Screw	BMZ20P020FZB
	2	Screw	BMZ20P025FTC
	3	Screw(M2x2)	CBA1556
	4	Screw(M2x2.5)	CBA1626
	5	Screw(M2x2.5)	CBA1609
	6	Screw(M2x4.5)	CBA1629
	7	Spring	CBH2460
	8	Spring	CBH2461
	9	Spring	CBH2484
	10	Spring	CBH2694
	11	Spring	CBH2486
	12	Spring	CBH2487
	13	Spring	CBH2500
	14	Connector	CDE6698
	15	Collar	CLA4329
	16	Collar	CLA4330
	17	Collar	CLA4331
	18	Gear	CND1649
	19	Cam Gear	CND1650
	20	Frame	CND1651
	21	Steer	CND1655
	22	Arm	CND1657
	23	Bracket	CND1658
	24	Bracket	CND1660
*	25	Lever	CNC9953
	26	Gear	CNV6612
	27	Holder	CNV6648
	28	Holder	CNV6738
*	29	Chassis Unit	CXC1642
*	30	Frame Unit	CXC1643
*	31	Arm Unit	CXC1647
	32	Spring	CBH2488
	33	Holder Unit	CXC1644
	34	Holder Unit	CXC1646
	35	Tray Unit	CXB6930
	36	Lever Unit	CXC1648
*	37	Lever Unit	CXC1649
	38	Lever Unit	CXC1650
*	39	Lever Unit	CXC1651
	40	Cam Motor Assy	CXB7522
	41	Washer	CBF1064
	42	Gear	CNV6610
	43	Gear	CNV6611
	44	Motor Unit(-A)(M1)	CXC1144
	45	Screw	JFZ20P020FTC
	46	Washer	YE20FTC
	47	ELV Motor Assy	CXB7523
	48	Screw	BMZ20P025FTC
	49	Washer	CBF1064
	50	Holder	CND1668
	51	Gear	CNV6634
	52	Gear	CNV6635
	53	PCB Unit(LED)	CWX2614
*	54	Connector(CN31)	CKS4523
	55	Motor Unit(-A)(M2)	CXC1145
	56	Screw	JFZ20P020FTC
*	57	Arm Unit	CXC1653
	58	Bracket Unit	CXC1654
*	59	Lever Unit	CXC1658
*	60	Lever Unit	CXC1659
*	61	Lever Unit	CXC1660
	62	Arm Assy	CXB8822
	63	Washer	CBF1038
	64	Spring	CBH2489
	65	Arm	CNV6735
	66	Bracket Unit	CXC1652
	67	Screw	BMZ20P025FTC
	68	Spring	CBH2459
	69	Volume(VR1)	CCW1023
	70	Bracket	CND1652
	71	Steer	CND1656
	72	Flexible PCB	CNP6368
	73	PCB Unit(SIDE)	CWX2613
	74	Connector(CN12)	CKS3991
*	75	Connector(CN14)	CKS4404
	76	Connector(CN13)	CKS4525
	77	Connector(CN11)	CKS4572
	78	Lever Unit	CXC1779
*	79	Lever Unit	CXB9121
*	80	Lever Unit	CXB9122
	81	Screw	JFZ20P020FTC
	82	Washer	CBF1037

2.4 MECHANISM ASSY(G2B)(SERVICE)(2)

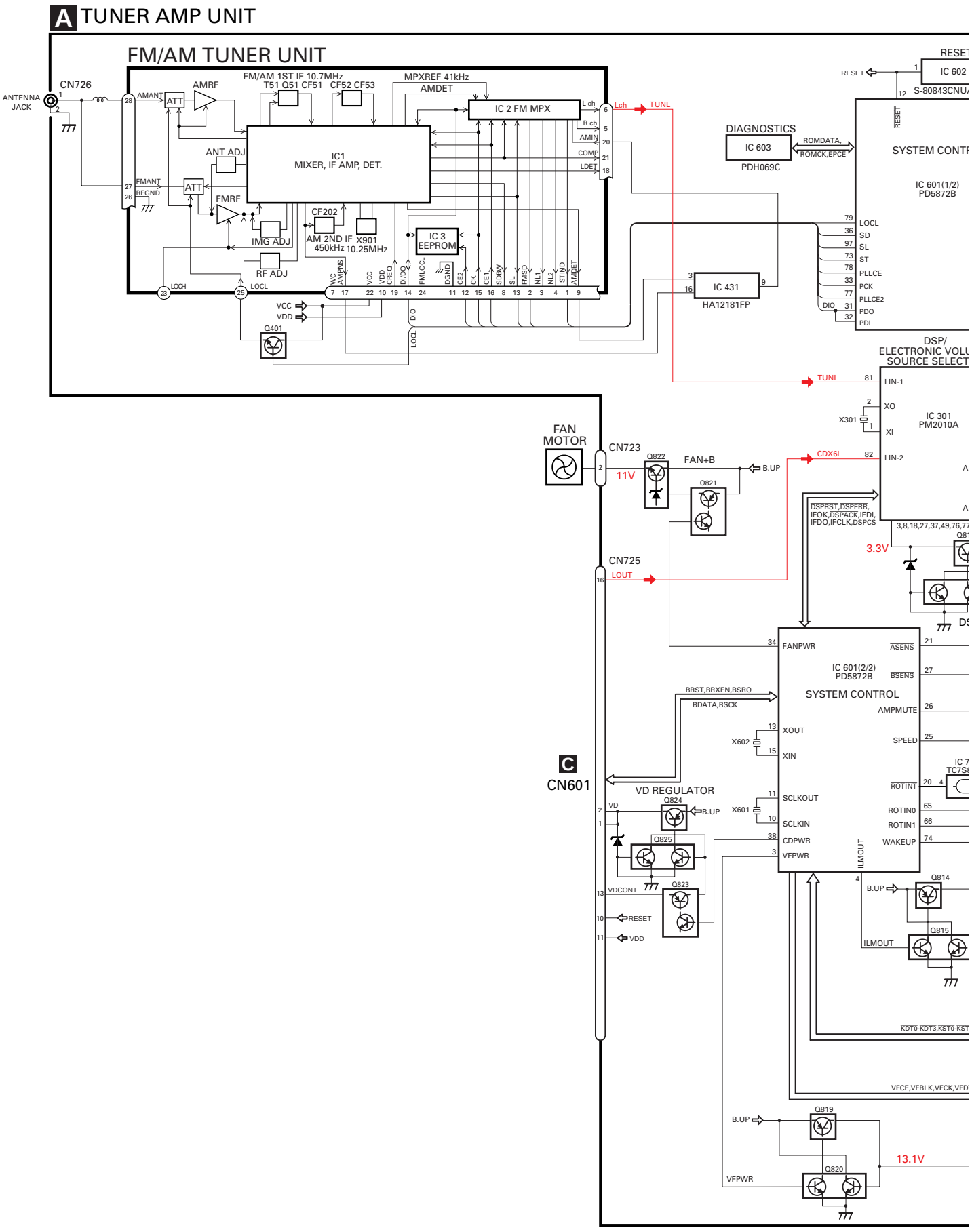


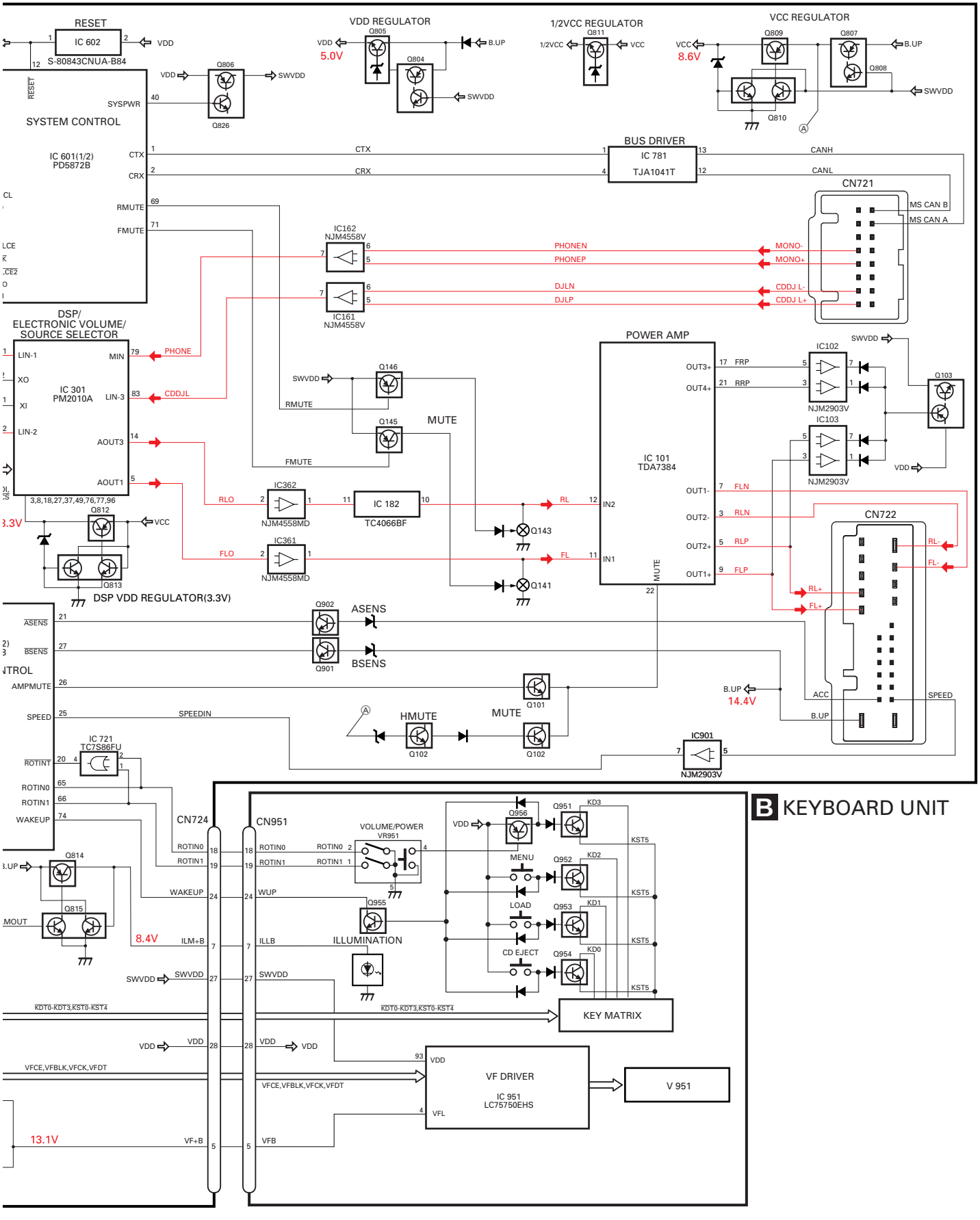
MECHANISM ASSY(G2B)(SERVICE)(2) PARTS LIST

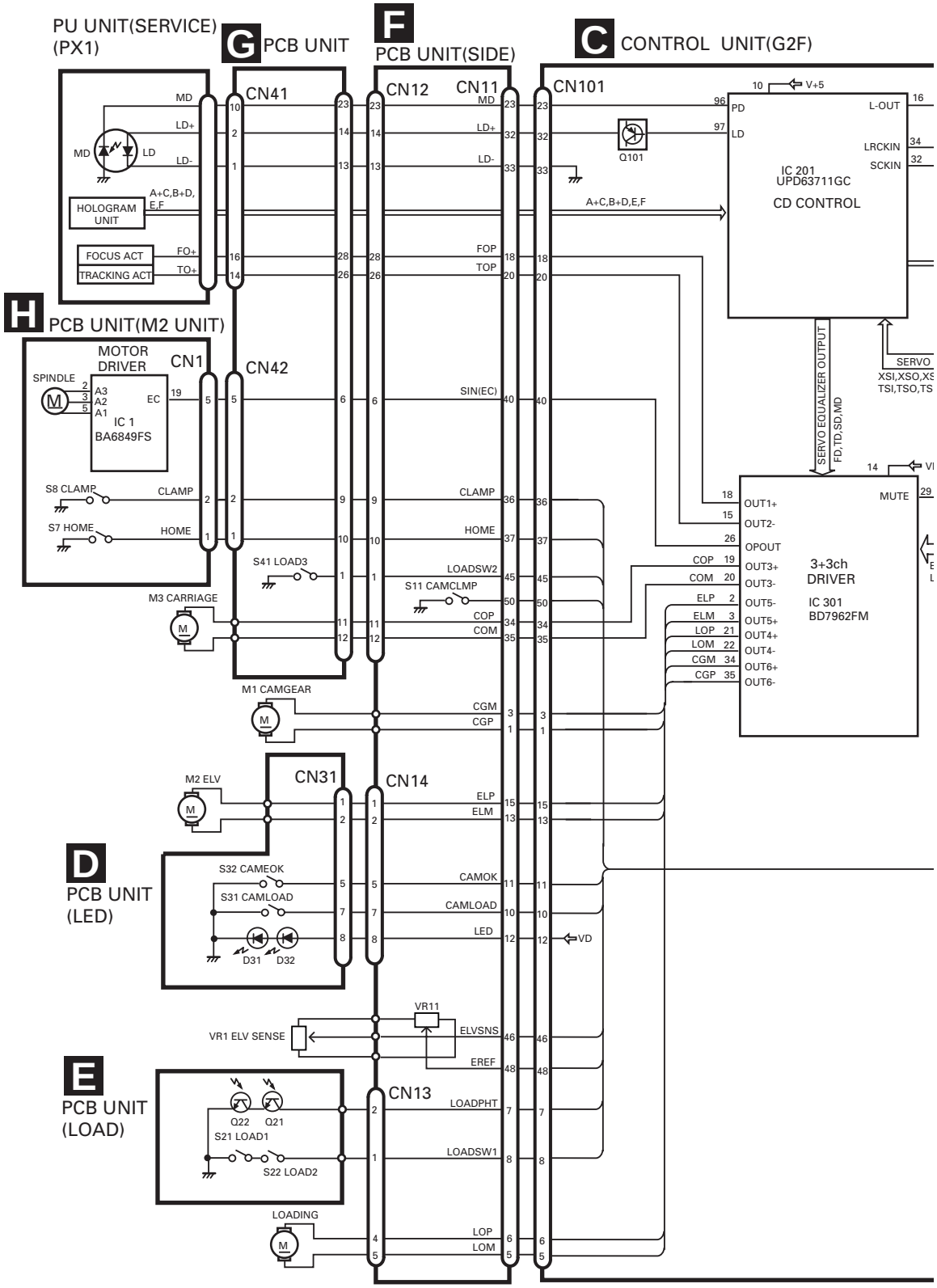
Mark	No.	Description	Part No.
*	1	Service CRG Mechanism Assy(G2)	CXX1767
	2	Screw(M2x2)	CBA1556
	3	Screw(M2x6)	CBA1628
	4	Washer	CBF1038
	5	Spring	CBH2453
	6	Spring	CBH2480
	7	Spring	CBL1521
*	8	Guide	CNC9402
	9	Flexible PCB	CNP6217
	10	Holder	CNV6624
	11	Holder	CNV6625
	12	Rack	CNV6642
	13	Arm	CNV6731
	14	Lever	CNV6736
	15	Holder	CNV6737
	16	PCB Unit	CWX2611
	17	Connector(CN41)	CKS3785
	18	Connector(CN42)	CKS4508
	19	Connector(CN1)	CKS4508
	20	Support Wheel Unit	CXC3778
	21	Screw Unit(-B)	CXB7518
	22	Carriage Motor Assy	CXB7521
	23	Washer	CBF1038
	24	Belt	CNT1088
	25	Pulley	CNV6627
	26	Gear	CNV6629
	27	Motor Unit(-A)(M3)	CXC1143
	28	Screw	JFZ14P020FTC
	29	Loading Mech. Assy	CXB7525
	30	Washer	CBF1037
*	31	Washer	CBF1075
*	32	Spring	CBH2450
	33	Spring	CBH2452
*	34	Spring	CBH2457
*	35	Spring	CBH2580
*	36	Frame	CND1653
*	37	Arm	CND1654
*	38	Sheet	CNM7295
	39	Roller	CNV6616
	40	Collar	CNV6617
*	41	Guide	CNV6622
*	42	Holder	CNV6636
*	43	Lever	CNV6732
*	44	Lever	CNV6733
	45	Collar	CNV6734
*	46	Holder	CNV7144
	47	Screw	JFZ12P018FTC
	48	Washer	CBF1037
*	49	Motor Unit(-A)	CXC1146
	50	Shaft Unit(-C)	CXB7528
	51	Screw	JFZ20P020FTC
	52	PU Unit(Service)(PX1)	CXX1568
*	53	Gear	CNV6620
*	54	Gear	CNV6621
	55	Switch(S7,8)	CSN1057
*	56	Connector	CDE6674

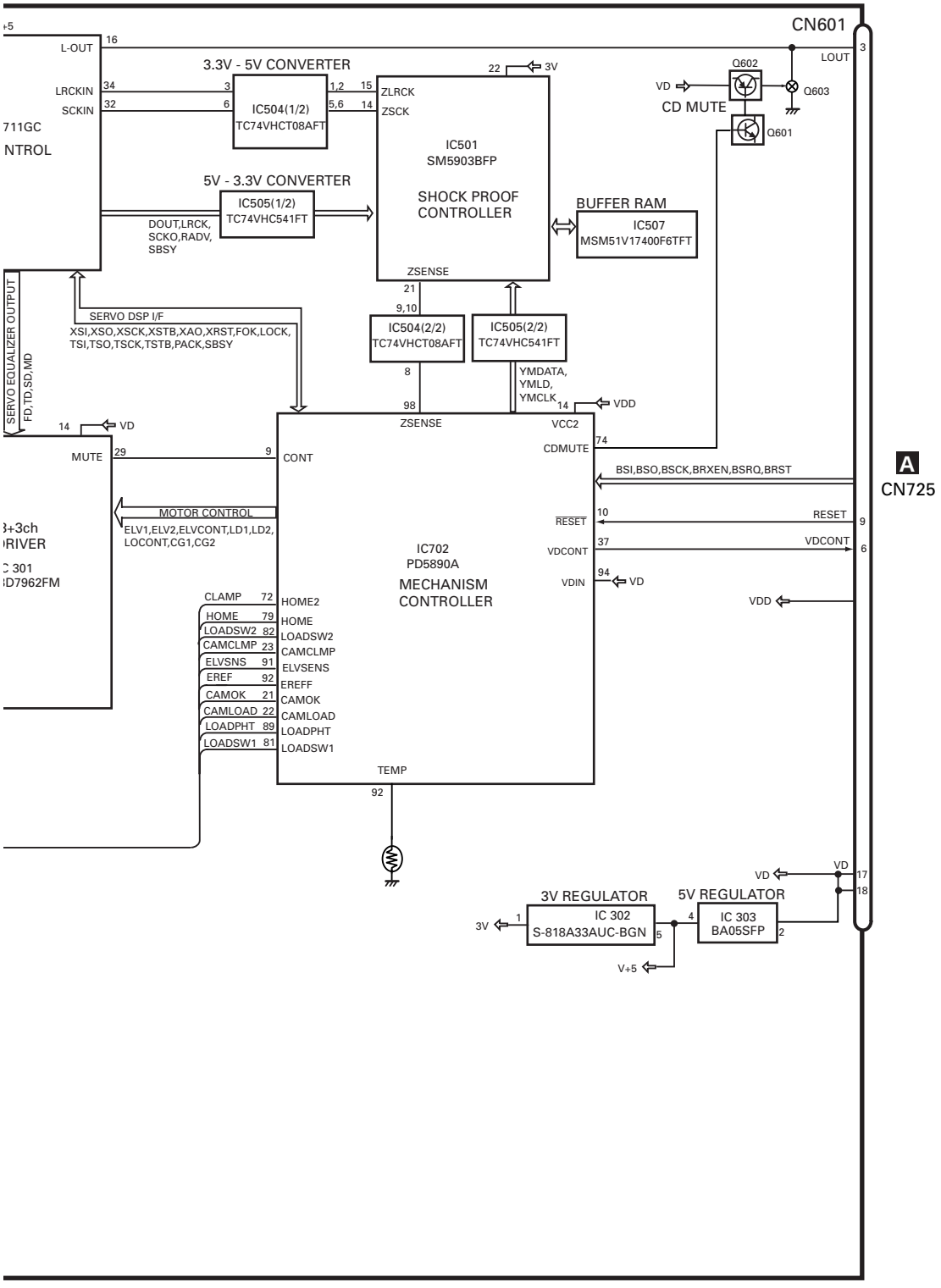
3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

3.1 BLOCK DIAGRAM



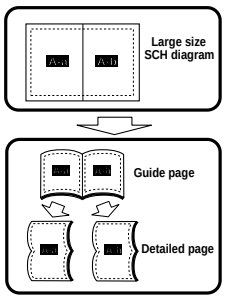

RESET
IC 602
S-80843CNUA-B84
VDD REGULATOR
5.0V
1/2VCC REGULATOR
VCC REGULATOR
8.6V
SYSTEM CONTROL
IC 601(1/2)
PD5872B
BUS DRIVER
IC 781
TJA1041T
CTX
CRX
CANH
CANL
CN721
MS CAN B
MS CAN A
IC162
NJM4558V
IC161
NJM4558V
PHONEN
PHONEP
MONO-
MONO+
DJLN
DJLP
CDDJ L-
CDDJ L+
DSP/
ELECTRONIC VOLUME/
SOURCE SELECTOR
IC 301
PM2010A
PHONE
CDDJL
RMUTE
FMUTE
MUTE
POWER AMP
IC 101
TDA7384
IC102
NJM2903V
IC103
NJM2903V
Q103
IC362
NJM4558MD
IC361
NJM4558MD
IC 182
TC4066BF
RLO
FLO
RL
FL
Q143
Q141
CN722
RL-
FL-
RL+
FL+
DSP VDD REGULATOR(3.3V)
Q812
Q813
Q902
Q901
ASENS
BSENS
Q101
HMUTE
Q102
IC901
NJM2903V
B.UP
14.4V
ACC
SPEED
SPEEDIN
IC 721
TC7S86FU
ROTINT
ROTIN0
ROTIN1
WAKEUP
AMPMUTE
CN724
CN951
VOLUME/POWER
VR951
ILLUMINATION
Q955
Q956
Q951
Q952
Q953
Q954
KD3
KD2
KD1
KD0
KST5
MENU
LOAD
CD EJECT
KEY MATRIX
8.4V
13.1V
VF DRIVER
IC 951
LC75750EHS
V 951
VFCE,VFBLK,VFCK,VFDT
KDT0-KDT3,KST0-KST4
B KEYBOARD UNIT

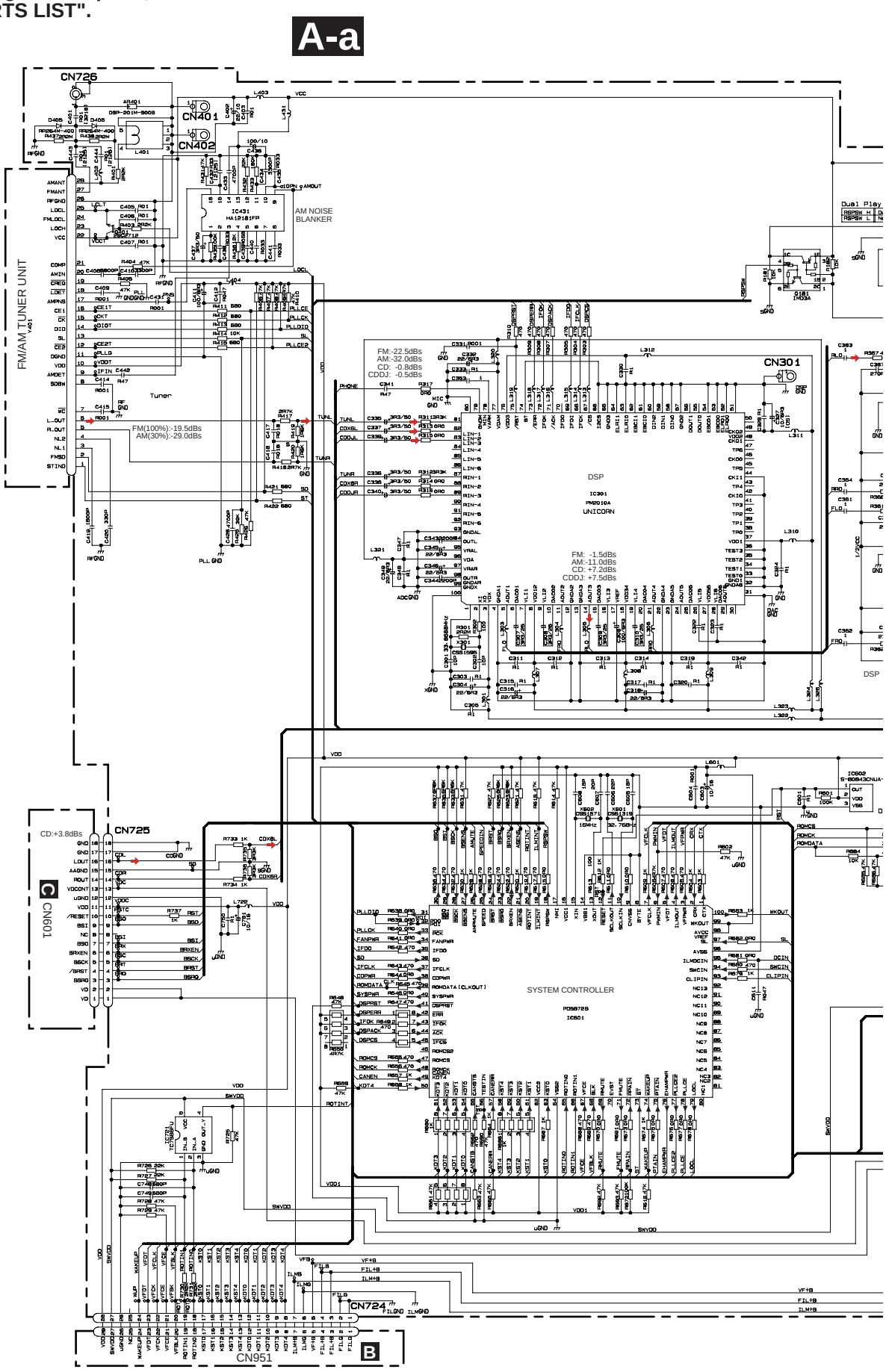

PU UNIT(SERVICE)
(PX1)
G PCB UNIT
F PCB UNIT(SIDE)
C CONTROL UNIT(G2F)
CN41
CN12
CN11
CN101
MD
LD+
LD-
LD
HOLOGRAM UNIT
A+C,B+D, E,F
FOCUS ACT
TRACKING ACT
FO+
TO+
FOP
TOP
Q101
IC 201
UPD63711GC
CD CONTROL
PD
LD
V+5
L-OUT
LRCKIN
SCKIN
SERVO EQUALIZER OUTPUT
FD,TD,SD,MD
SERVO
XSI,XSO,XS
TSI,TSO,TS
H PCB UNIT(M2 UNIT)
MOTOR DRIVER
CN1
CN42
SPINDLE
A3
A2
A1
EC
IC 1
BA6849FS
SIN(EC)
S8 CLAMP
CLAMP
S7 HOME
HOME
S41 LOAD3
LOADSW2
S11 CAMCLMP
M3 CARRIAGE
COP
COM
M1 CAMGEAR
CGM
CGP
MUTE
OUT1+
OUT2-
OPOUT
OUT3+
OUT3-
OUT5-
OUT5+
OUT4+
OUT4-
OUT6+
OUT6-
3+3ch DRIVER
IC 301
BD7962FM
M2 ELV
CN31
CN14
ELP
ELM
D PCB UNIT (LED)
S32 CAMEOK
S31 CAMLOAD
CAMOK
CAMLOAD
LED
D31
D32
VD
VR11
VR1 ELV SENSE
ELVSNS
EREF
E PCB UNIT (LOAD)
CN13
Q22
Q21
S21 LOAD1
S22 LOAD2
LOADPHT
LOADSW1
LOADING
LOP
LOM


CN601
L-OUT
16
LOUT
3
3.3V - 5V CONVERTER
22
3V
LRCKIN
34
3
SCKIN
32
6
IC504(1/2)
TC74VHCT08AFT
1,2
15
5,6
14
ZLRCK
ZSCK
IC501
SM5903BFP
SHOCK PROOF
CONTROLLER
Q602
VD
Q603
CD MUTE
Q601
5V - 3.3V CONVERTER
IC505(1/2)
TC74VHC541FT
DOUT,LRCK,
SCKO,RADV,
SBSY
BUFFER RAM
IC507
MSM51V17400F6TFT
ZSENSE
21
9,10
IC504(2/2)
TC74VHCT08AFT
IC505(2/2)
TC74VHC541FT
SERVO EQUALIZER OUTPUT
FD,TD,SD,MD
SERVO DSP I/F
XSI,XSO,XSCK,XSTB,XAO,XRST,FOK,LOCK,
TSI,TSO,TSCK,TSTB,PACK,SBSY
8
YMDATA,
YMLD,
YMCLK
14
VDD
98
ZSENSE
VCC2
14
VD
MUTE
29
9
CONT
CDMUTE
74
BSI,BSO,BSCK,BRXEN,BSRQ,BRST
A
CN725
MOTOR CONTROL
ELV1,ELV2,ELVCONT,LD1,LD2,
LOCONT,CG1,CG2
RESET
10
RESET
9
VDCONT
37
VDCONT
6
IC702
PD5890A
MECHANISM
CONTROLLER
VDIN
94
VD
VDD
CLAMP
72
HOME2
HOME
79
HOME
LOADSW2
82
LOADSW2
CAMCLMP
23
CAMCLMP
ELVSNS
91
ELVSENS
EREF
92
EREFF
CAMOK
21
CAMOK
CAMLOAD
22
CAMLOAD
LOADPHT
89
LOADPHT
LOADSW1
81
LOADSW1
TEMP
92
VD
17
18
3V REGULATOR
IC 302
S-818A33AUC-BGN
1
5
4
5V REGULATOR
IC 303
BA05SFP
2
3V
V+5

3.2 TUNER AMP UNIT

Note: When ordering service parts, be sure to refer to " EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".





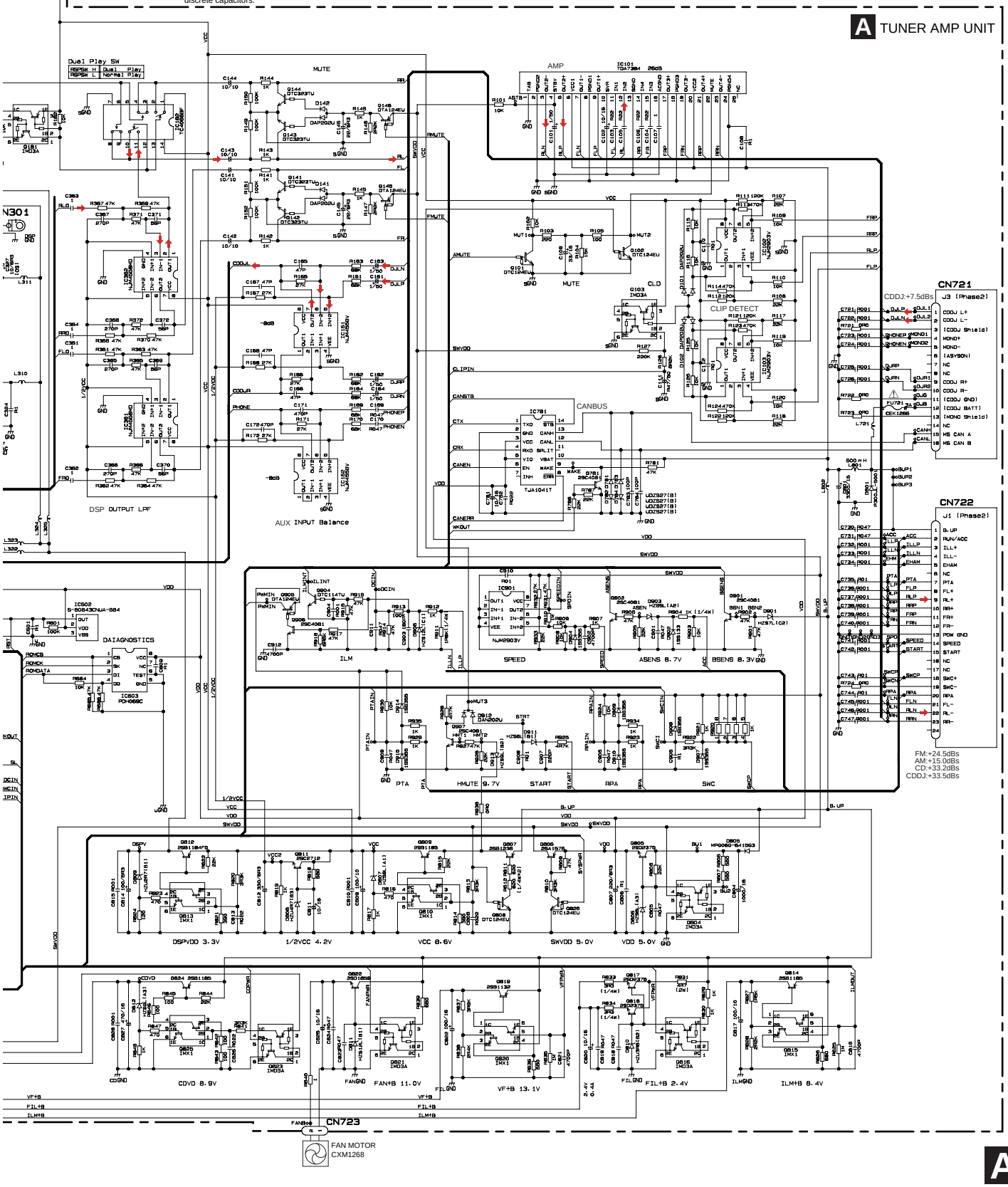
A-b

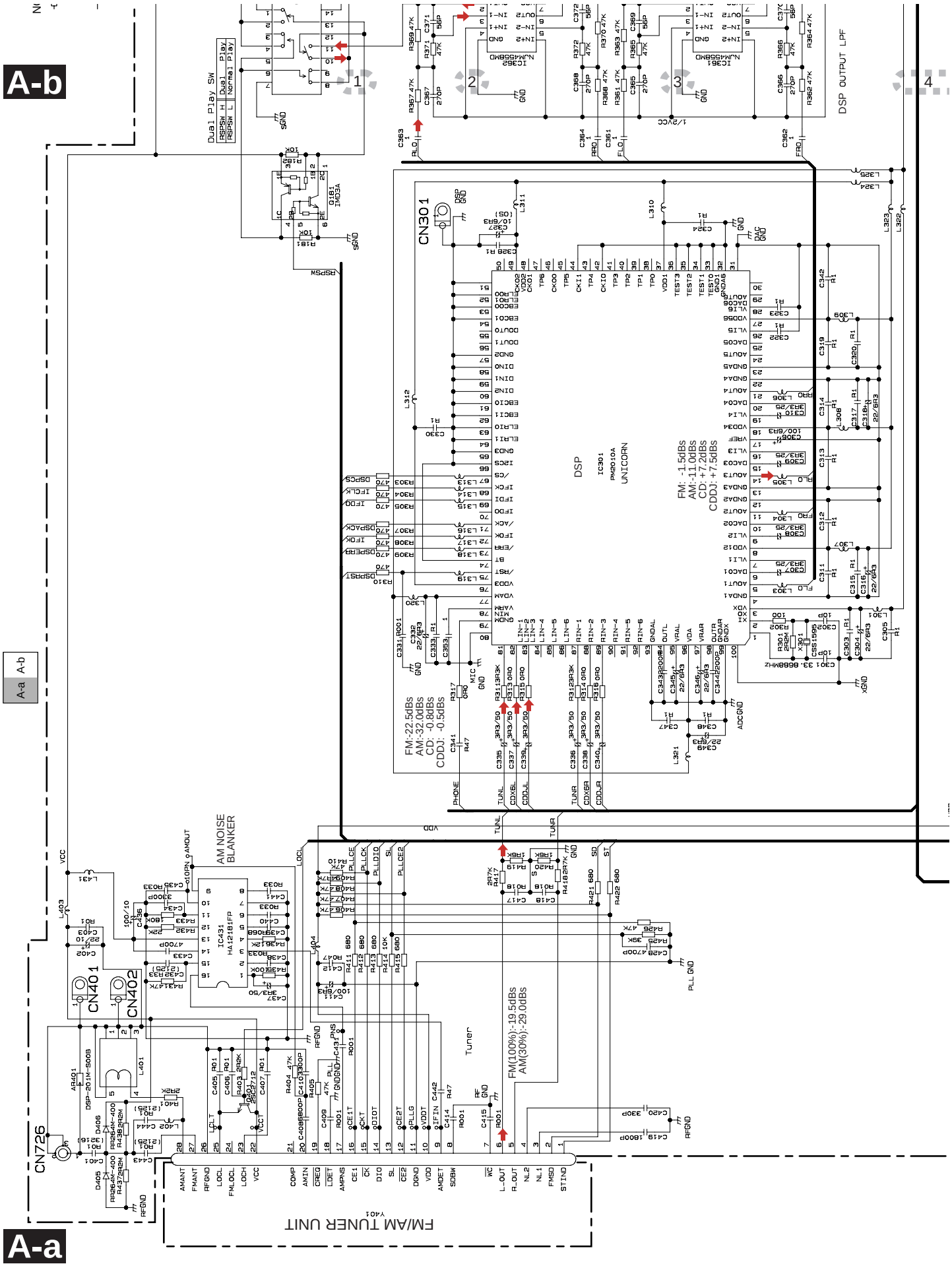
NOTE :
- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

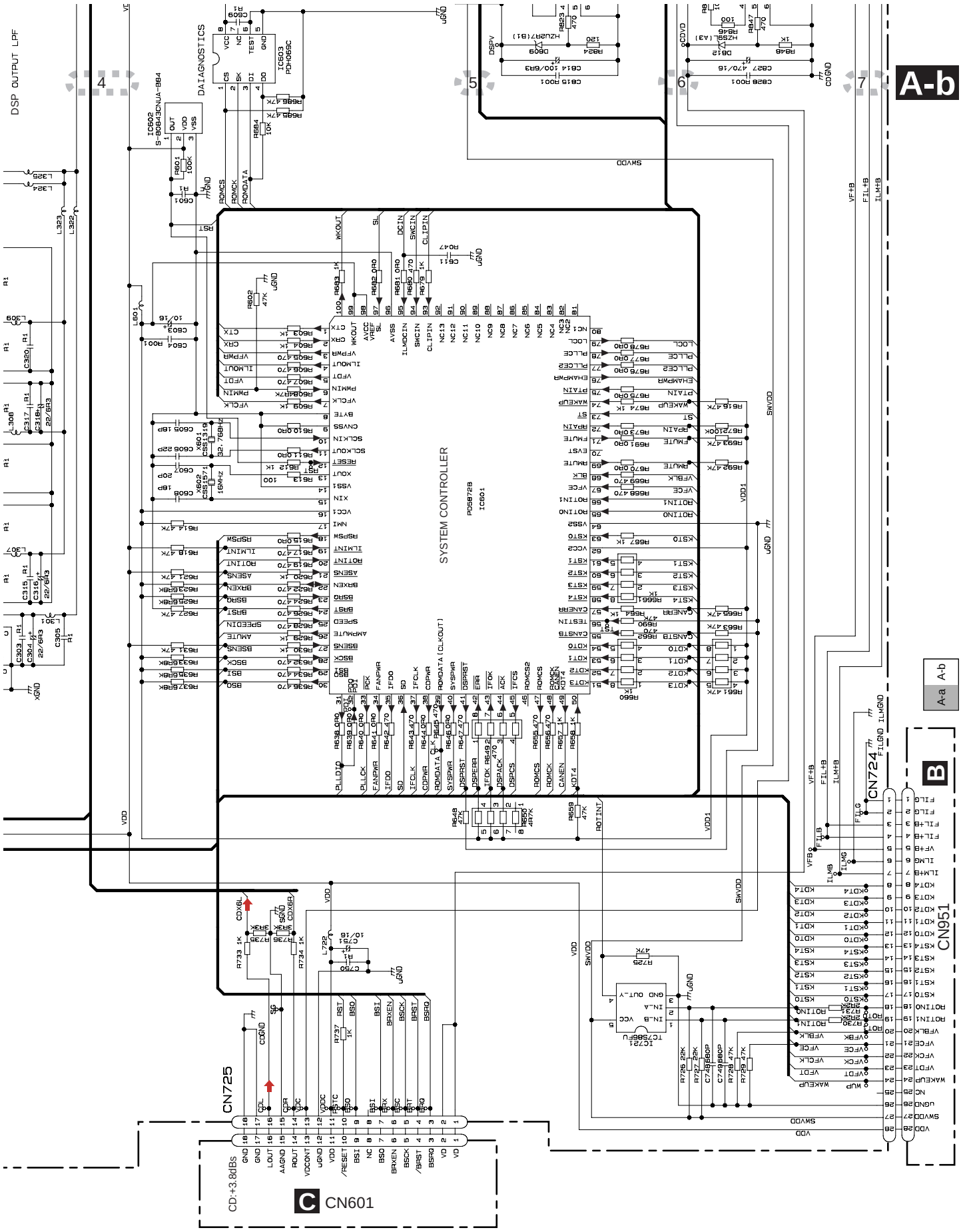
Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022

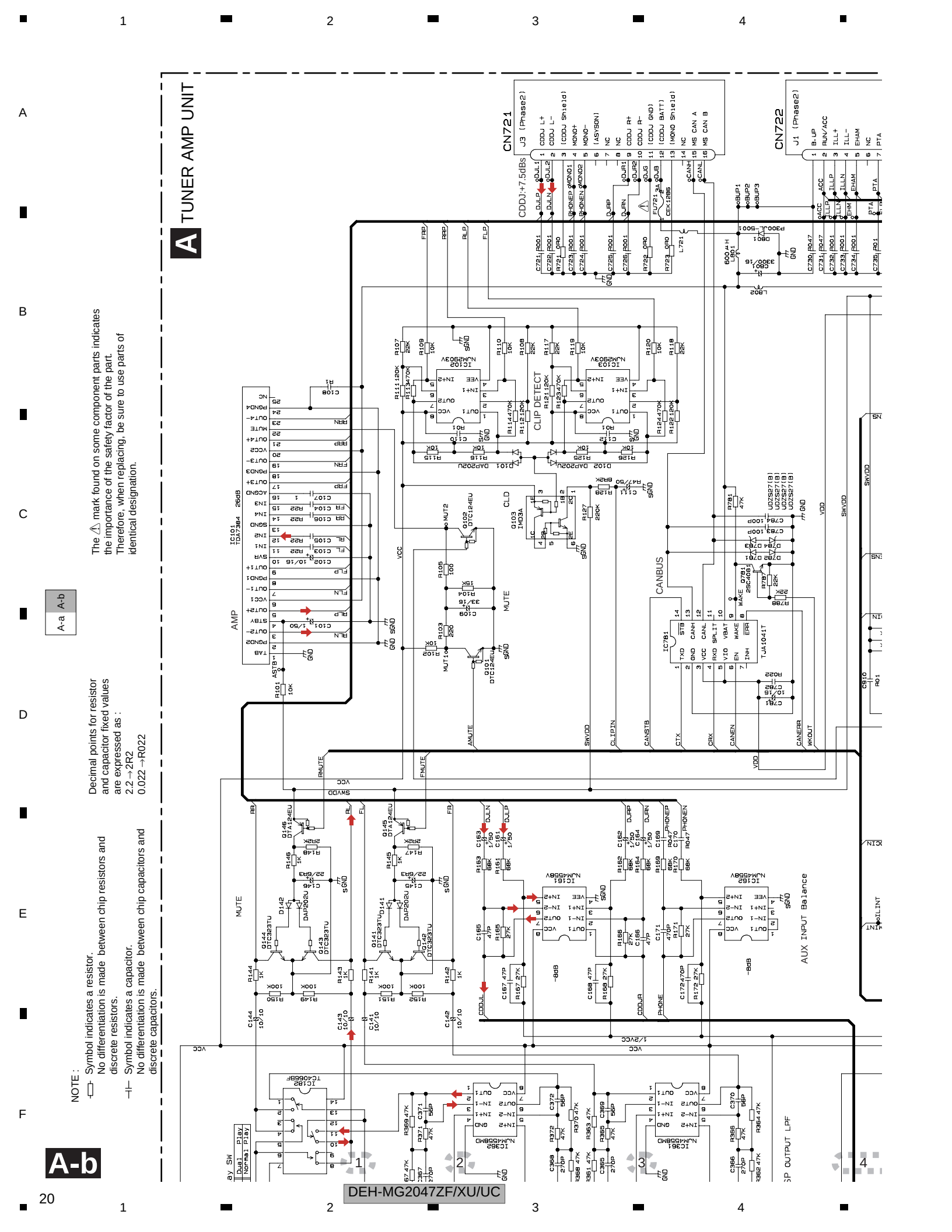
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

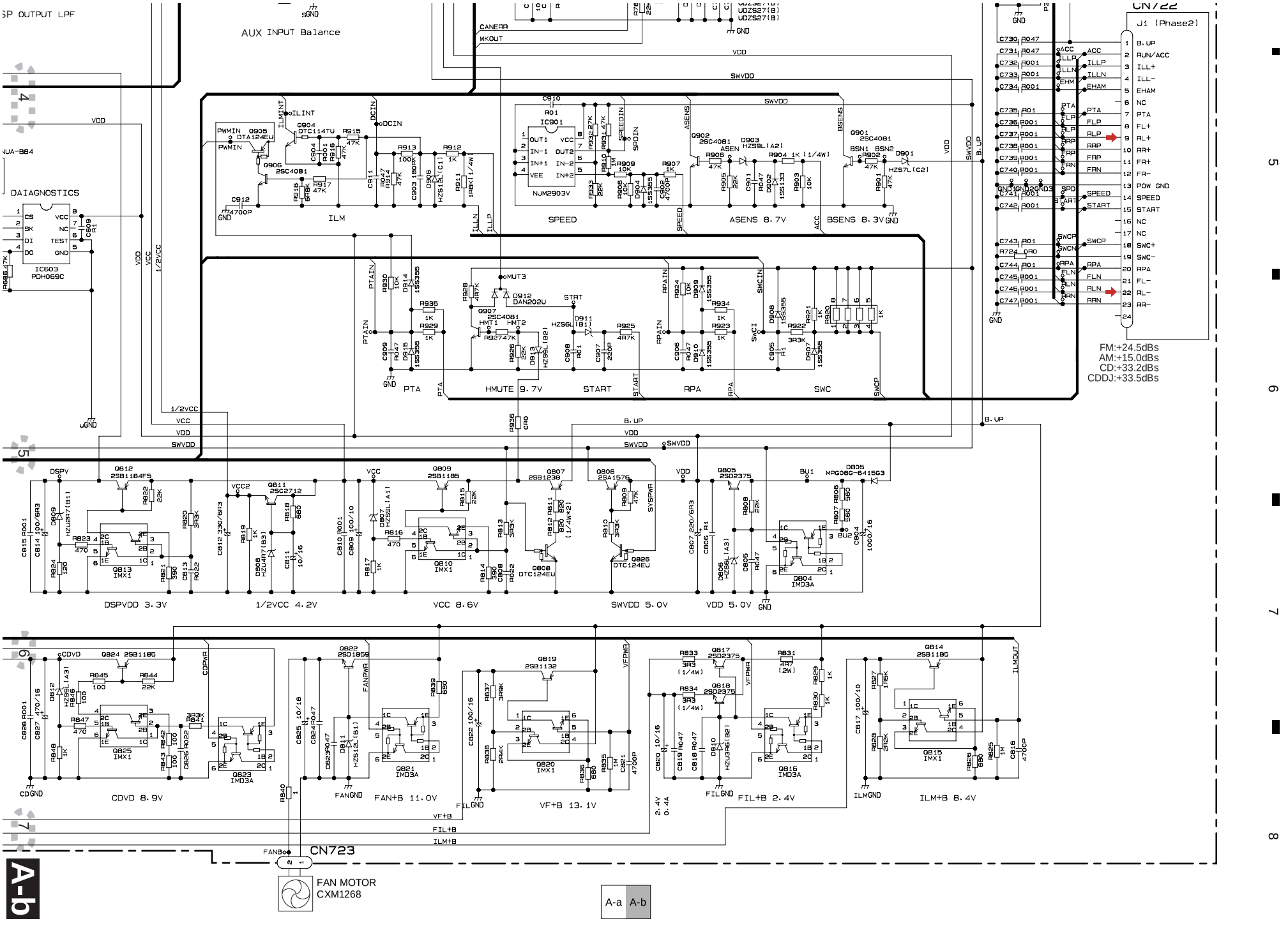
A TUNER AMP UNIT



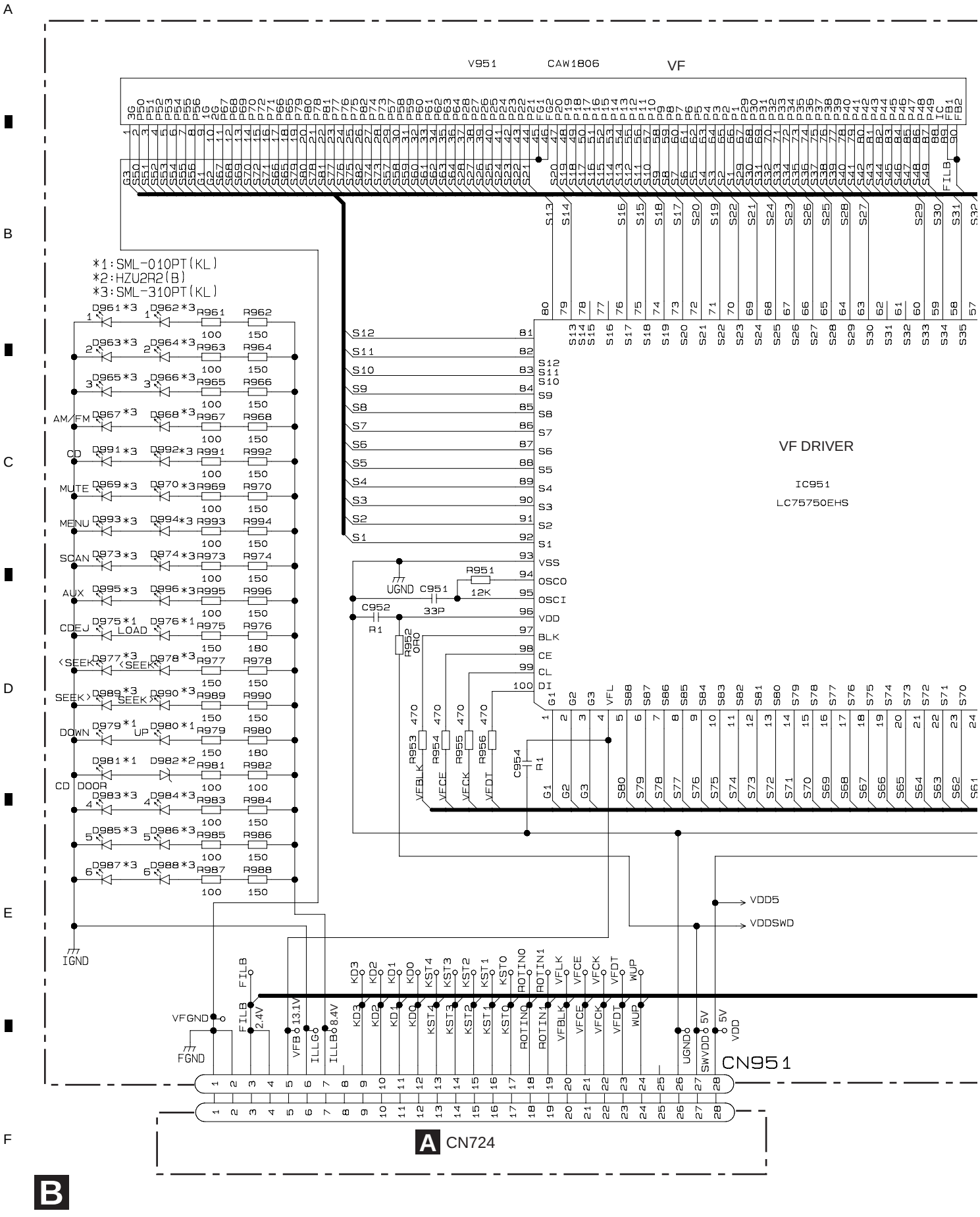

A-b
A-a
DSP OUTPUT LPF
Dual Play SW
CN301
DSP
IC301
PW2010A
UNICORN
FM: -1.5dBs
AM: -11.0dBs
CD: +7.2dBs
CDDJ: +7.5dBs
FM:-22.5dBs
AM:-32.0dBs
CD: -0.8dBs
CDDJ: -0.5dBs
AM NOISE BLANKER
IC431
HA12181FP
CN401
CN402
CN726
Tuner
FM(100%):-19.5dBs
AM(30%):-29.0dBs
FM/AM TUNER UNIT
V401


DSP OUTPUT LPF
DAIAGNOSTICS
SYSTEM CONTROLLER
PD5872B
IC601
CN724
CN951
CN725
CN601
CD:+3.8dBs
A-b
A-a
B
C

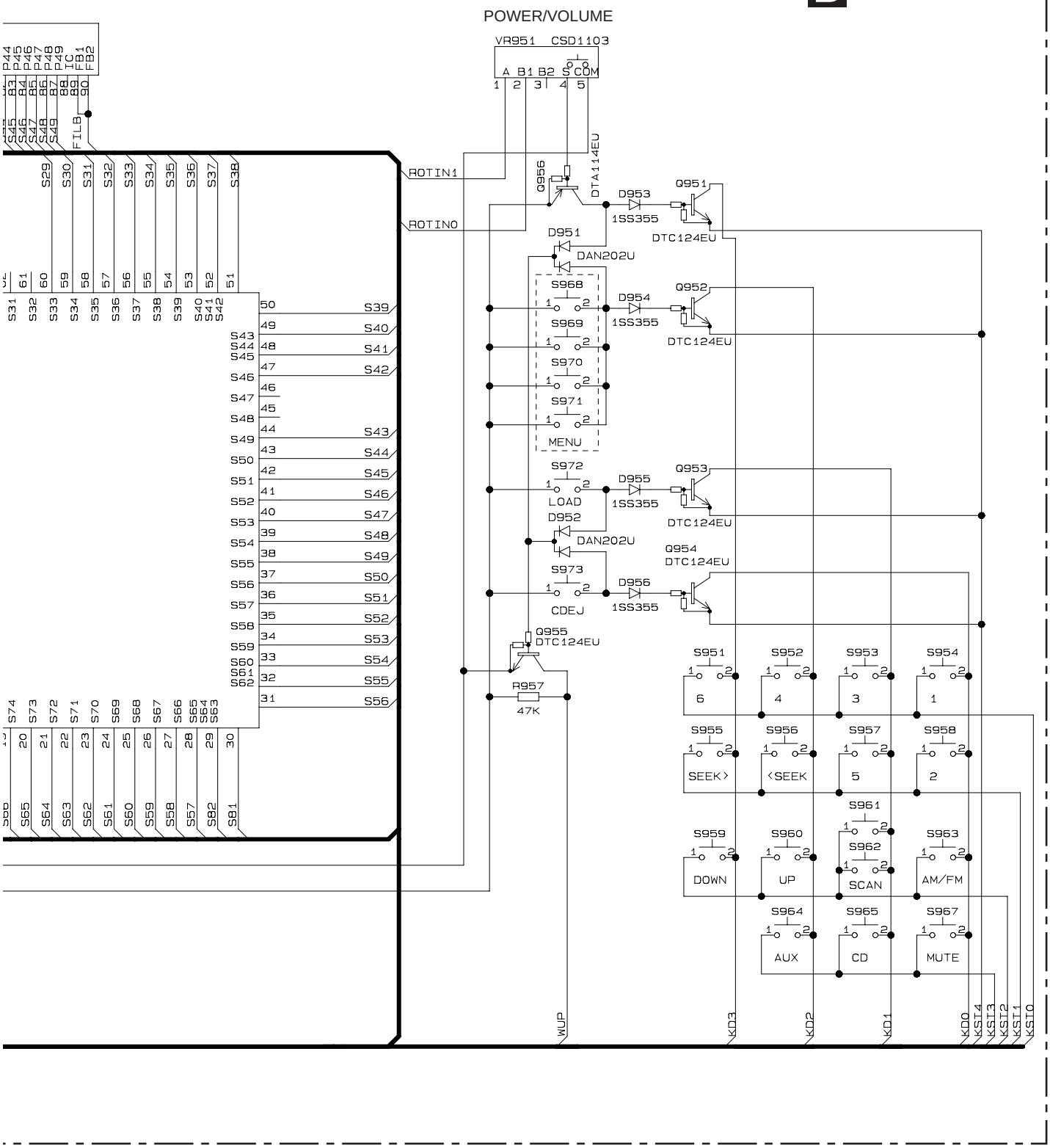

A TUNER AMP UNIT
CN721
CN722
CDDJ:+7.5dBs
AMP
MUTE
CLIP DETECT
CLD
CANBUS
AUX INPUT Balance
SP OUTPUT LPF
DEH-MG2047ZF/XU/UC
A-b
A-a A-b
NOTE :
Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.
Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part.
Therefore, when replacing, be sure to use parts of identical designation.
Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022


DEH-MG2047ZF/XU/UC
A-b
A-a
AUX INPUT Balance
DAIAGNOSTICS
IC603
PDH069C
ILM
SPEED
ASENS 8.7V
BSENS 8.3V
PTA
HMUTE 9.7V
START
RPA
SWC
CN722
J1 (Phase2)
FM:+24.5dBs
AM:+15.0dBs
CD:+33.2dBs
CDDJ:+33.5dBs
DSPVDD 3.3V
1/2VCC 4.2V
VCC 8.6V
SWVDD 5.0V
VDD 5.0V
CDVD 8.9V
FAN+B 11.0V
VF+B 13.1V
FIL+B 2.4V
ILM+B 8.4V
CN723
FAN MOTOR
CXM1268

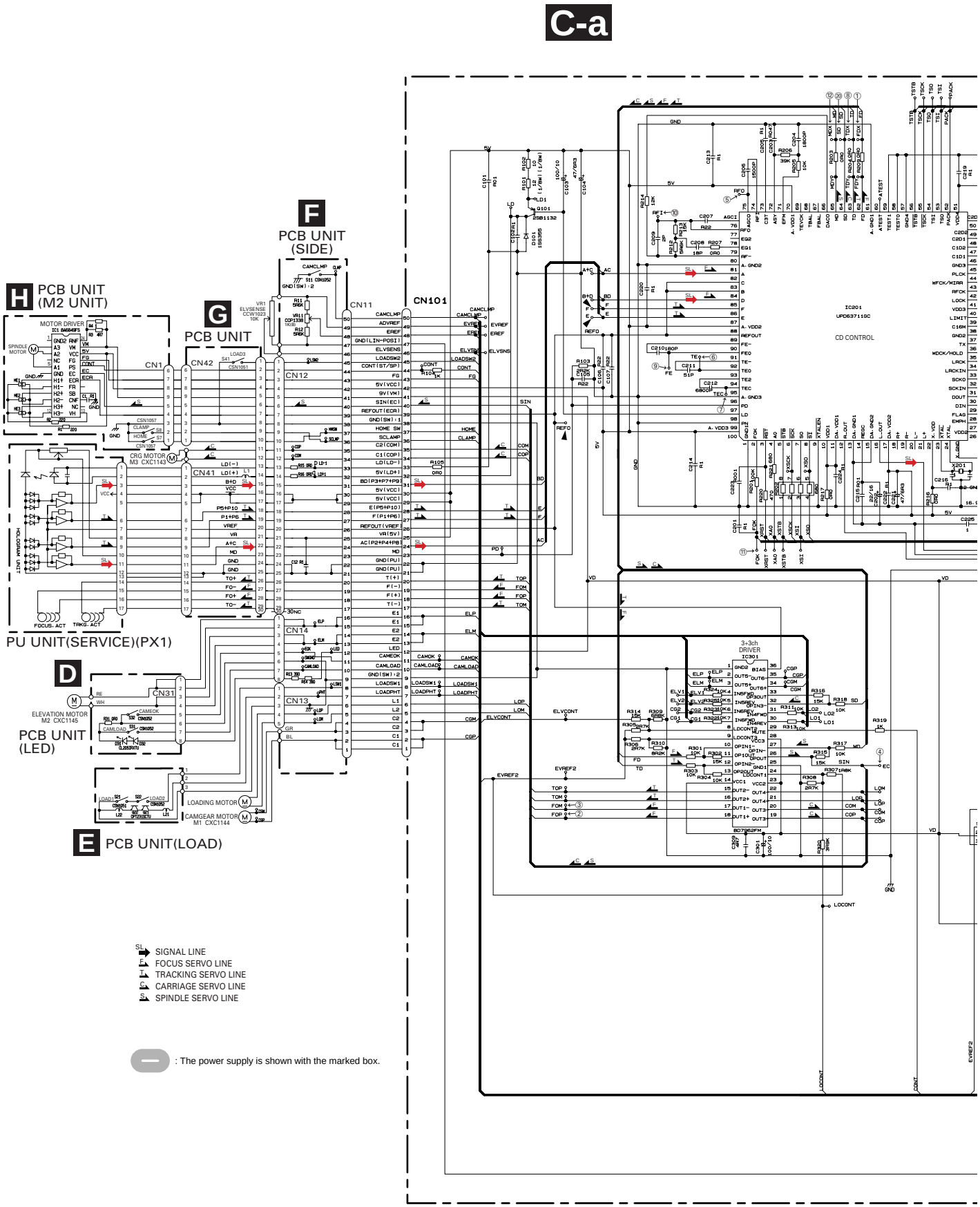
3.3 KEYBOARD UNIT



B KEYBOARD UNIT



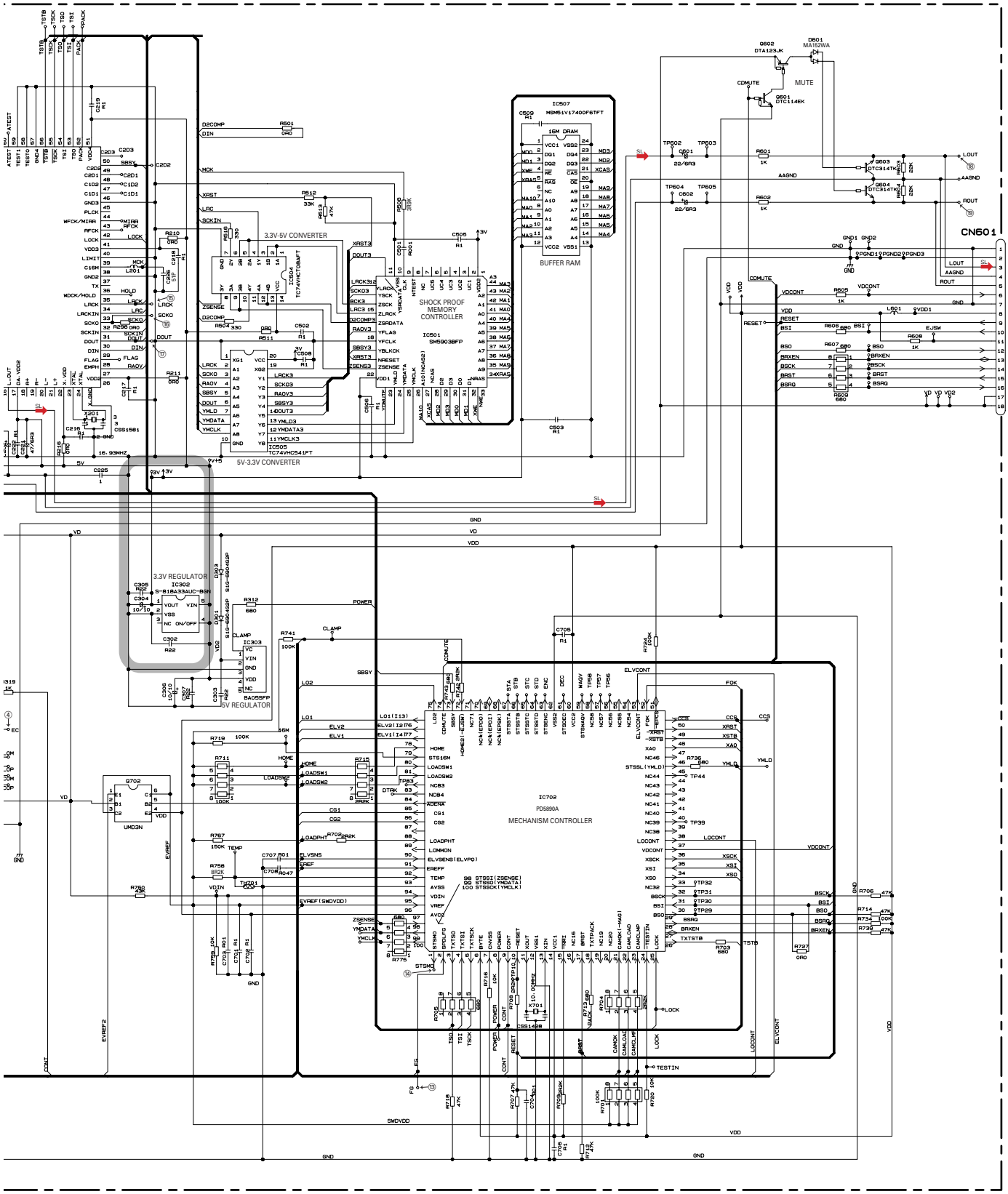
3.4 CD MECHANISM MODULE(GUIDE PAGE)

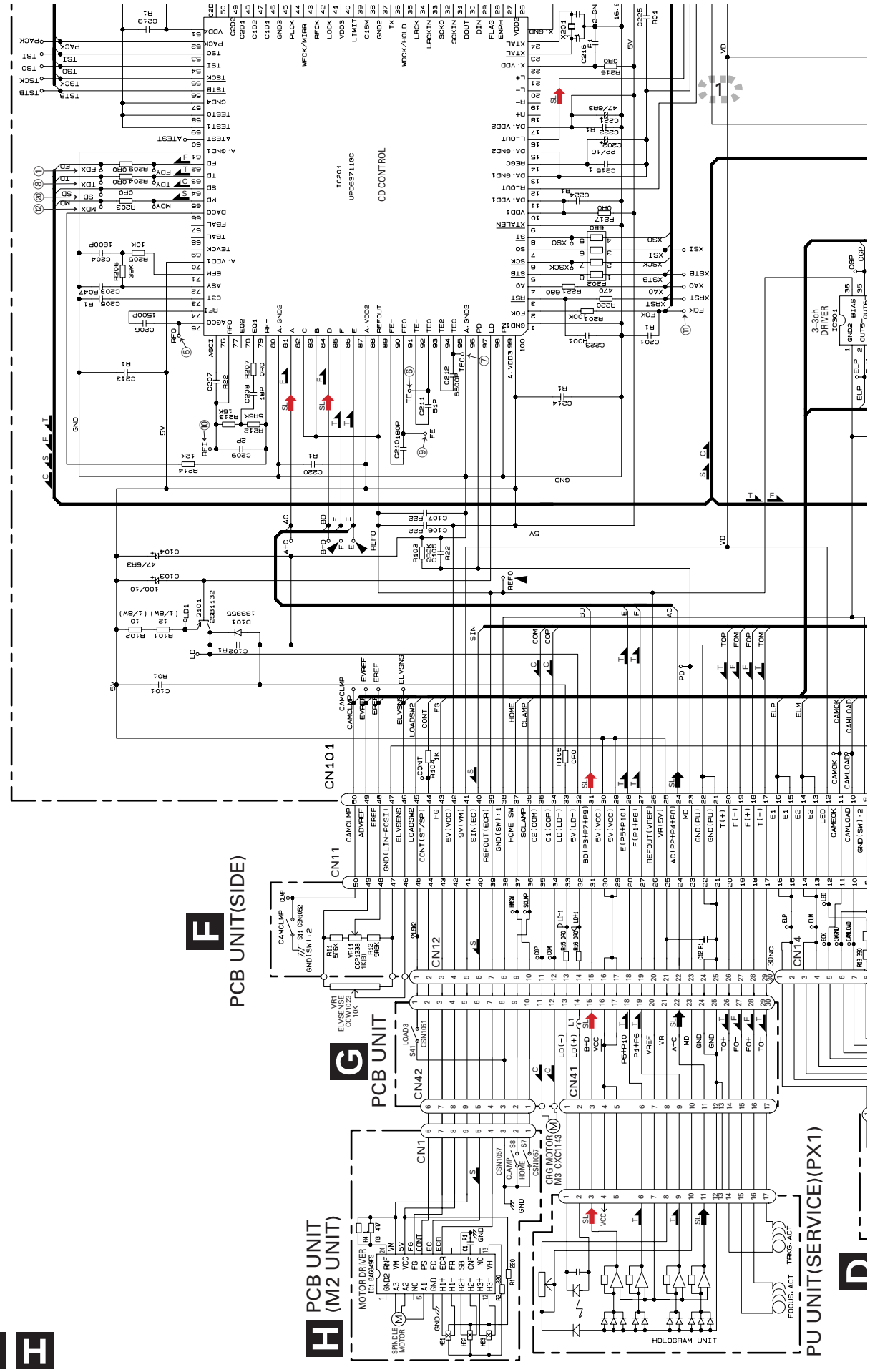


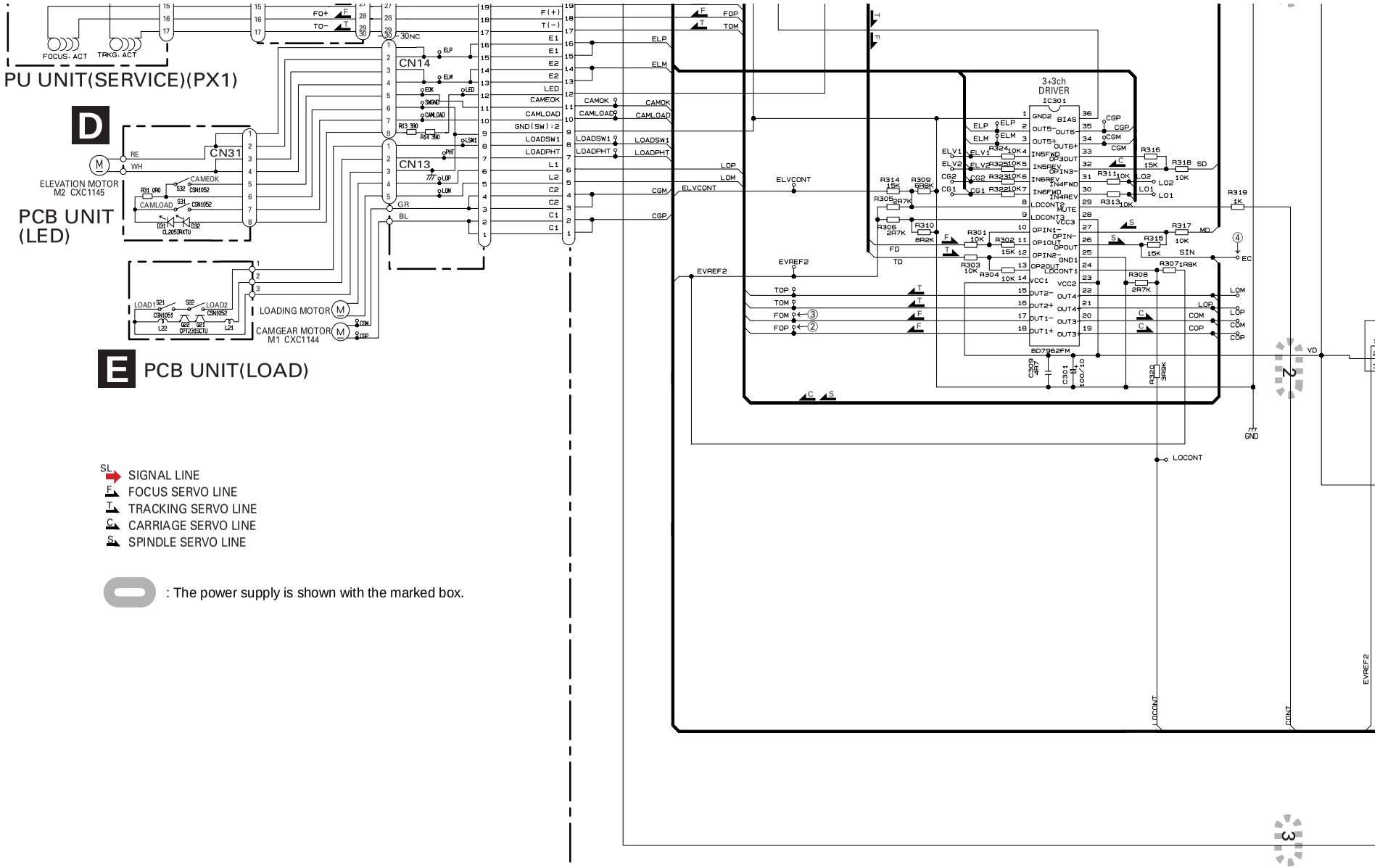
C D E F G H

C-b

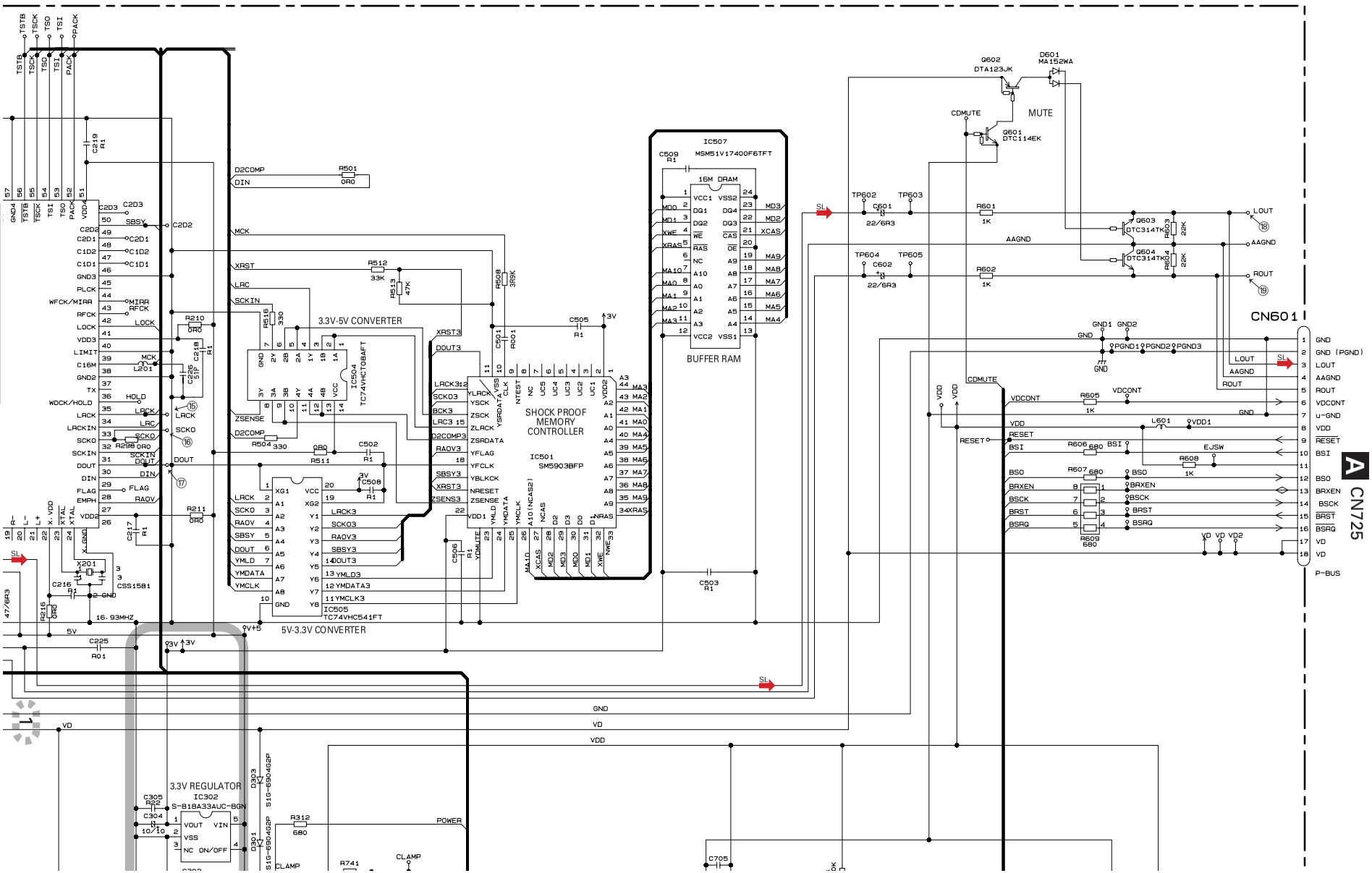
C CONTROL UNIT(G2F)

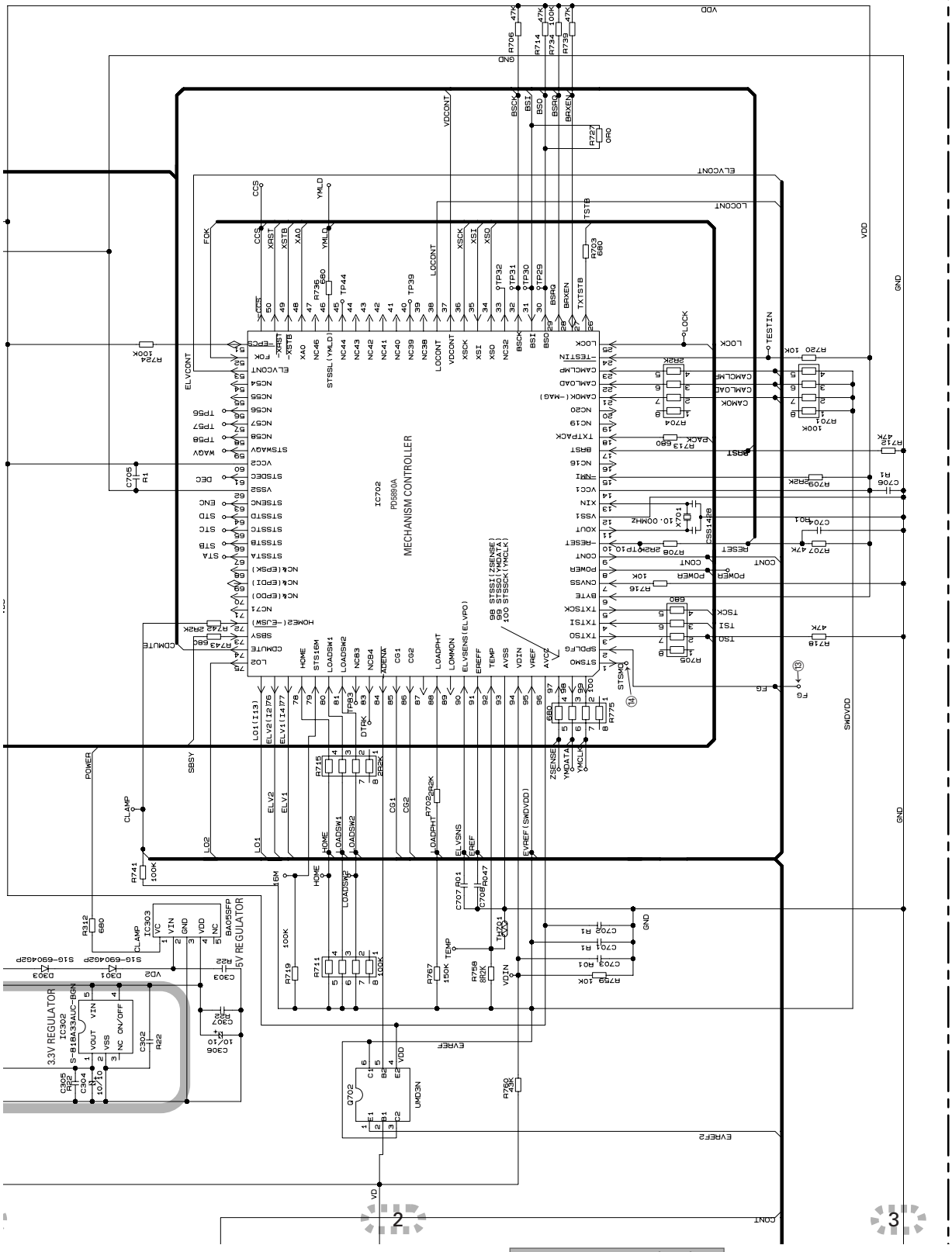



CD CONTROL
IC201
UPD63711GC
CN101
CN11
CN12
CN14
CN41
CN42
CN1
PCB UNIT(SIDE)
PCB UNIT
PCB UNIT (M2 UNIT)
PU UNIT(SERVICE)(PX1)
MOTOR DRIVER
SPINDLE MOTOR
CRG MOTOR M3 CXC1743
HOLOGRAM UNIT
3-3ch DRIVER IC301
FOCUS: ACT
TRKG: ACT


PU UNIT(SERVICE)(PX1)
FOCUS. ACT
TRKG. ACT
D
PCB UNIT
(LED)
ELEVATION MOTOR
M2 CXC1145
CAMLOAD
CAMEOK
CN31
CN14
CN13
E
PCB UNIT(LOAD)
LOAD1
LOAD2
LOADING MOTOR
CAMGEAR MOTOR
M1 CXC1144
3+3ch
DRIVER
IC301
BD7962FM
SL SIGNAL LINE
F FOCUS SERVO LINE
T TRACKING SERVO LINE
C CARRIAGE SERVO LINE
S SPINDLE SERVO LINE
: The power supply is shown with the marked box.

C CONTROL UNIT(G2F)



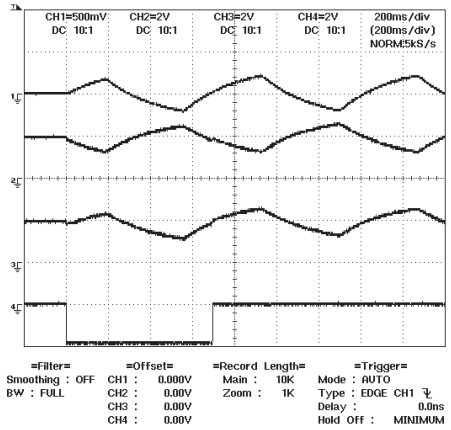

IC702
PD5890A
MECHANISM CONTROLLER
5V REGULATOR
3.3V REGULATOR
IC303
IC302
S-818A33AUC-BGN
BA05SFP
2
3

C-a C-b

C-b

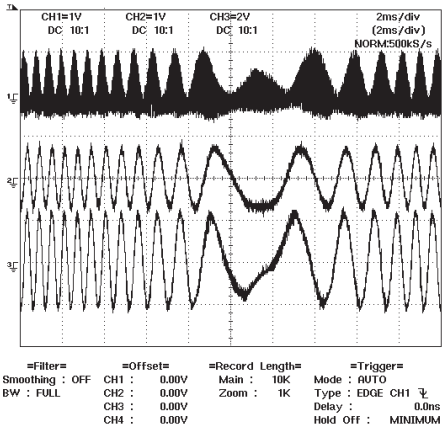
Note: The encircled numbers denote measuring points in the circuit diagram.

CH1 : ① FDX Mode:Test
CH2 : ② FOP
CH3 : ③ FOM
CH4 : ④ EC
Focus search mode



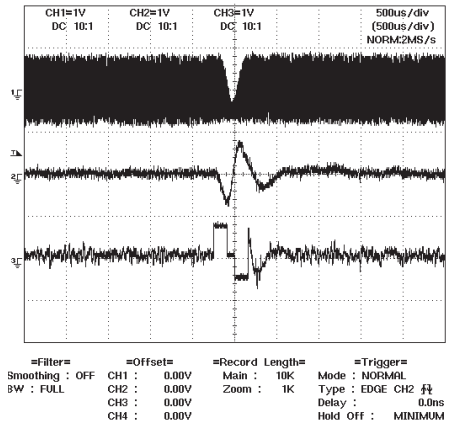
CH1 : ⑤ RFO Mode:Test
CH2 : ⑥ TE
CH3 : ⑦ TEC

Tracking open



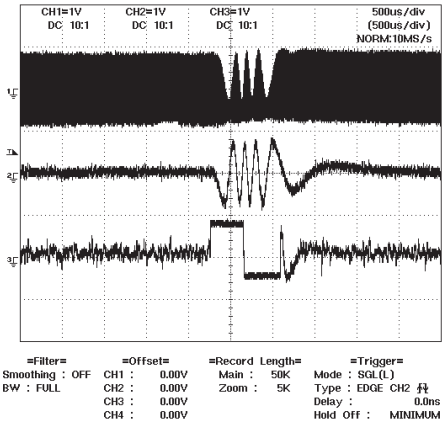
CH1 : ⑤ RFO Mode:Test
CH2 : ⑥ TE
CH3 : ⑧ TDX

1 Track Jump



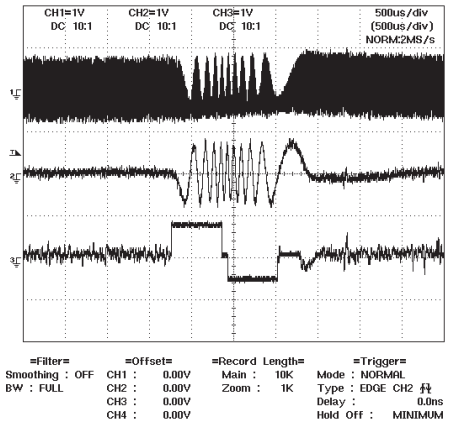
CH1 : ⑤ RFO Mode:Test
CH2 : ⑥ TE
CH3 : ⑧ TDX

4 Track Jump



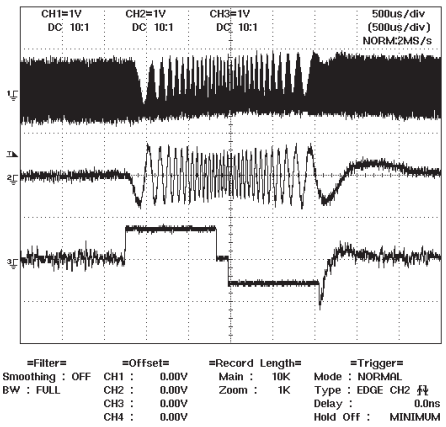
CH1 : ⑤ RFO Mode:Test
CH2 : ⑥ TE
CH3 : ⑧ TDX

10 Track Jump



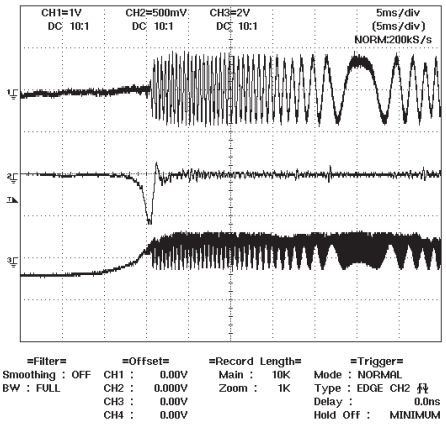
CH1 : ⑤ RFO Mode:Test
CH2 : ⑥ TE
CH3 : ⑧ TDX

32 Track Jump



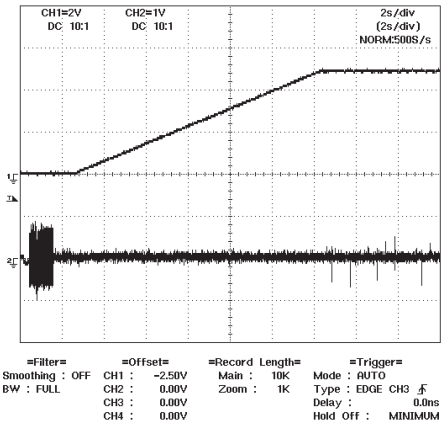
CH1 : ⑥ TE Mode:Normal
CH2 : ⑨ FE
CH3 : ⑩ RFI

Focus close



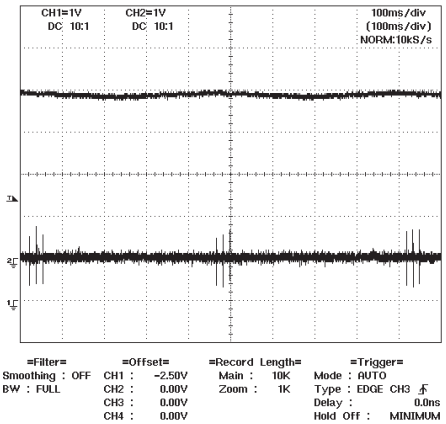
CH1 : ⑭ STSMO Mode:Normal
CH2 : ⑥ TE

Memory capacity (remaining) at the starting of PLAY

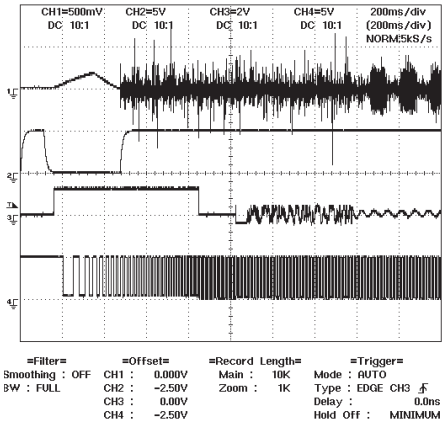


CH1 : ⑭ RFO Mode:Normal
CH2 : ⑥ TE

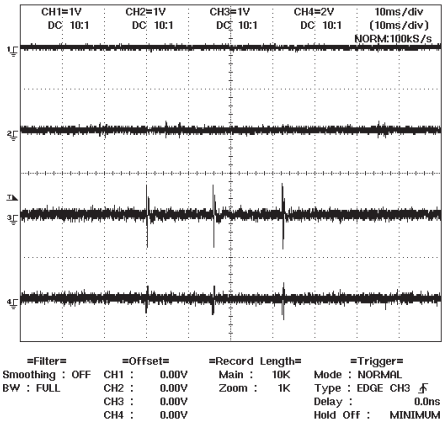
Memory capacity (remaining) during PLAY



CH1 : ① FDX Mode:Normal
CH2 : ⑪ FOK
CH3 : ⑫ MDX
CH4 : ⑬ FG
Setup

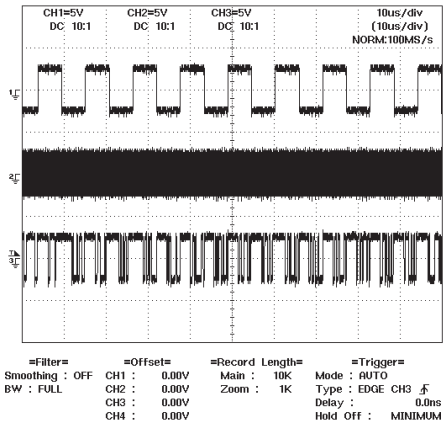


CH1 : ⑨ FE Mode:Normal
CH2 : ① FDX
CH3 : ⑥ TE
CH4 : ⑧ TDX
During "Play"



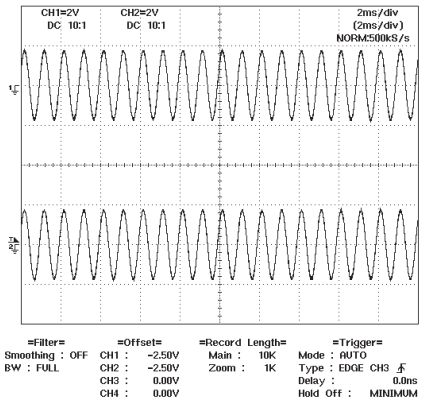
CH1 : ⑮ LRCK Mode:Normal
CH2 : ⑯ SCKO
CH3 : ⑰ DOUT

Digital audio data(x2 speed)

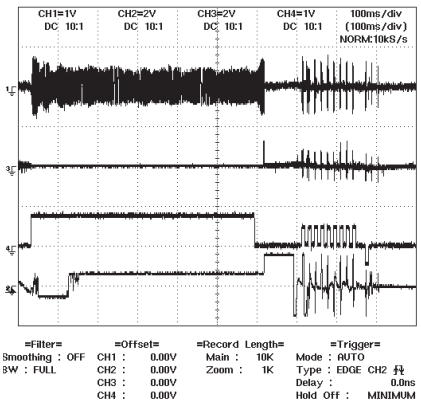


CH1 : ⑱ LOUT Mode:Normal
CH2 : ⑲ ROUT

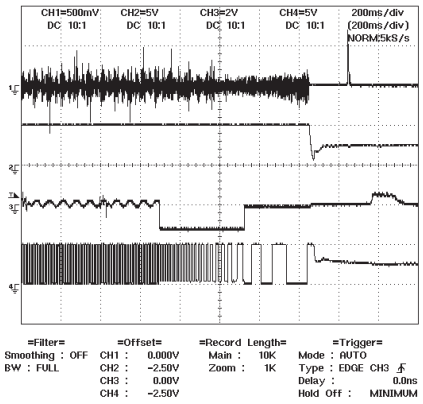
Audio output(1kHz , 0dB)



CH1 : ⑥ TE Mode:Normal
CH2 : ⑧ TDX
CH3 : ⑳ SD
CH4 : ④ EC
During inside / outside search



CH1 : ① FDX Mode:Normal
CH2 : ⑪ FOK
CH3 : ⑫ MDX
CH4 : ⑬ FG
DISC stop



A

B

C

D

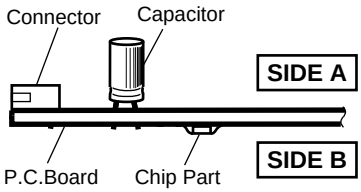
E

F

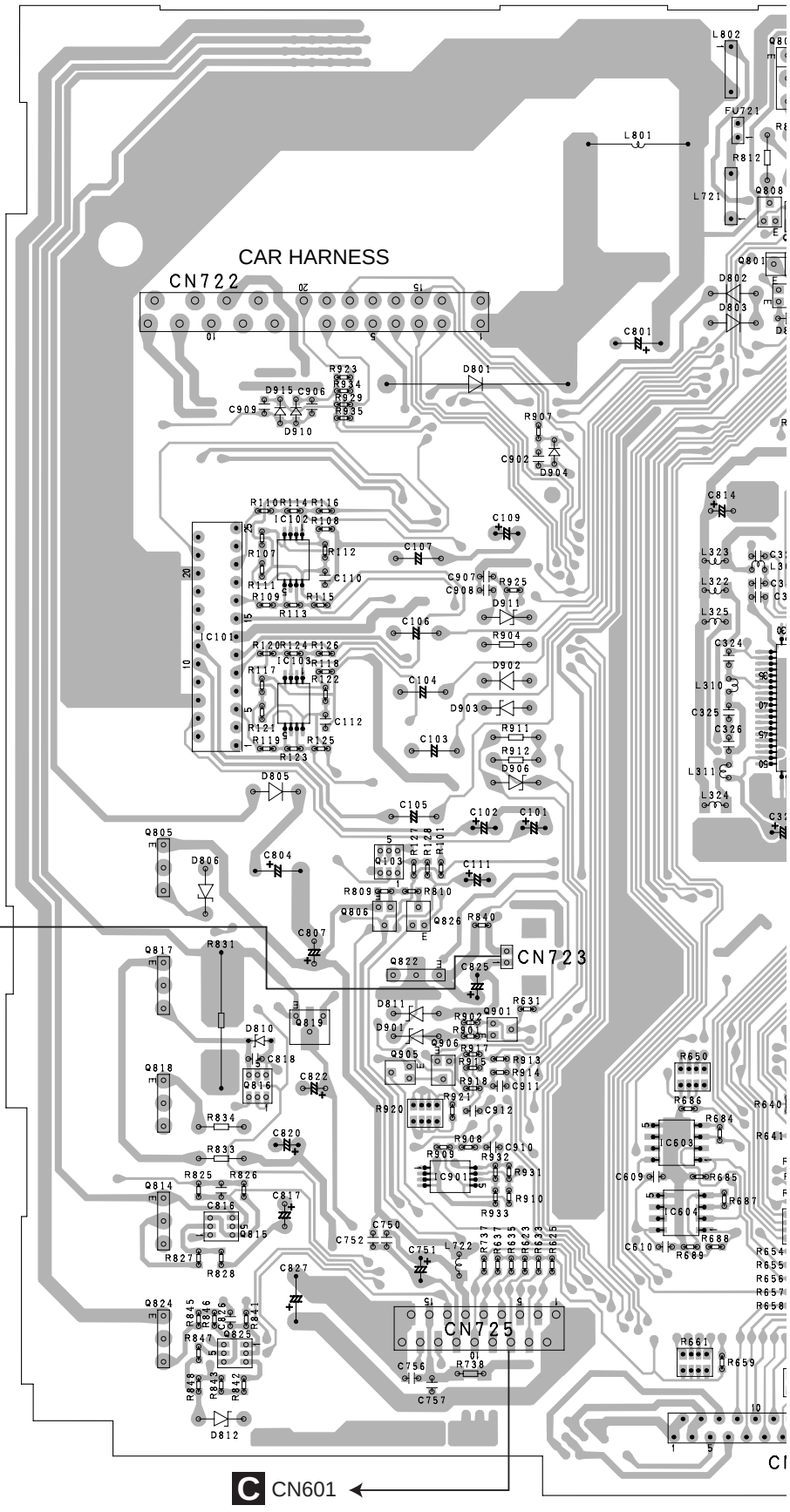
4. PCB CONNECTION DIAGRAM
4.1 TUNER AMP UNIT

NOTE FOR PCB DIAGRAMS

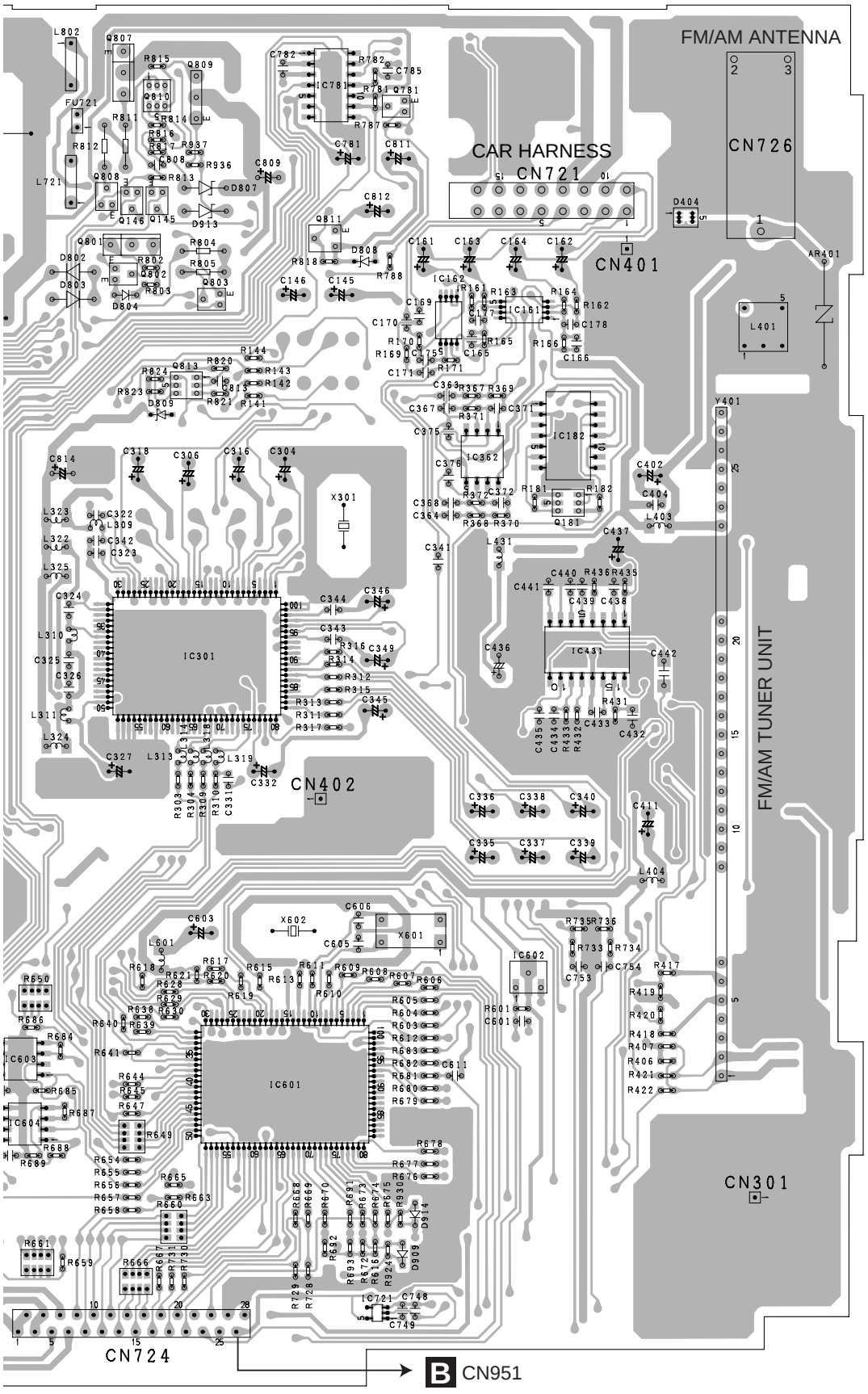
1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams



A TUNER AMP UNIT



SIDE A



IC,Q

Q807

Q809

IC781 Q781

Q810

Q808

Q811 Q146 Q145

Q801

Q802 IC162

Q803

IC161

Q813

IC182

IC362

IC102

Q181

IC101

IC103

IC431 IC301

Q805

Q103

Q806

Q826

Q817 Q822

Q901

Q819 IC602 Q906

Q905

Q818

Q816

IC603

IC601 IC901

Q814

IC604

Q815

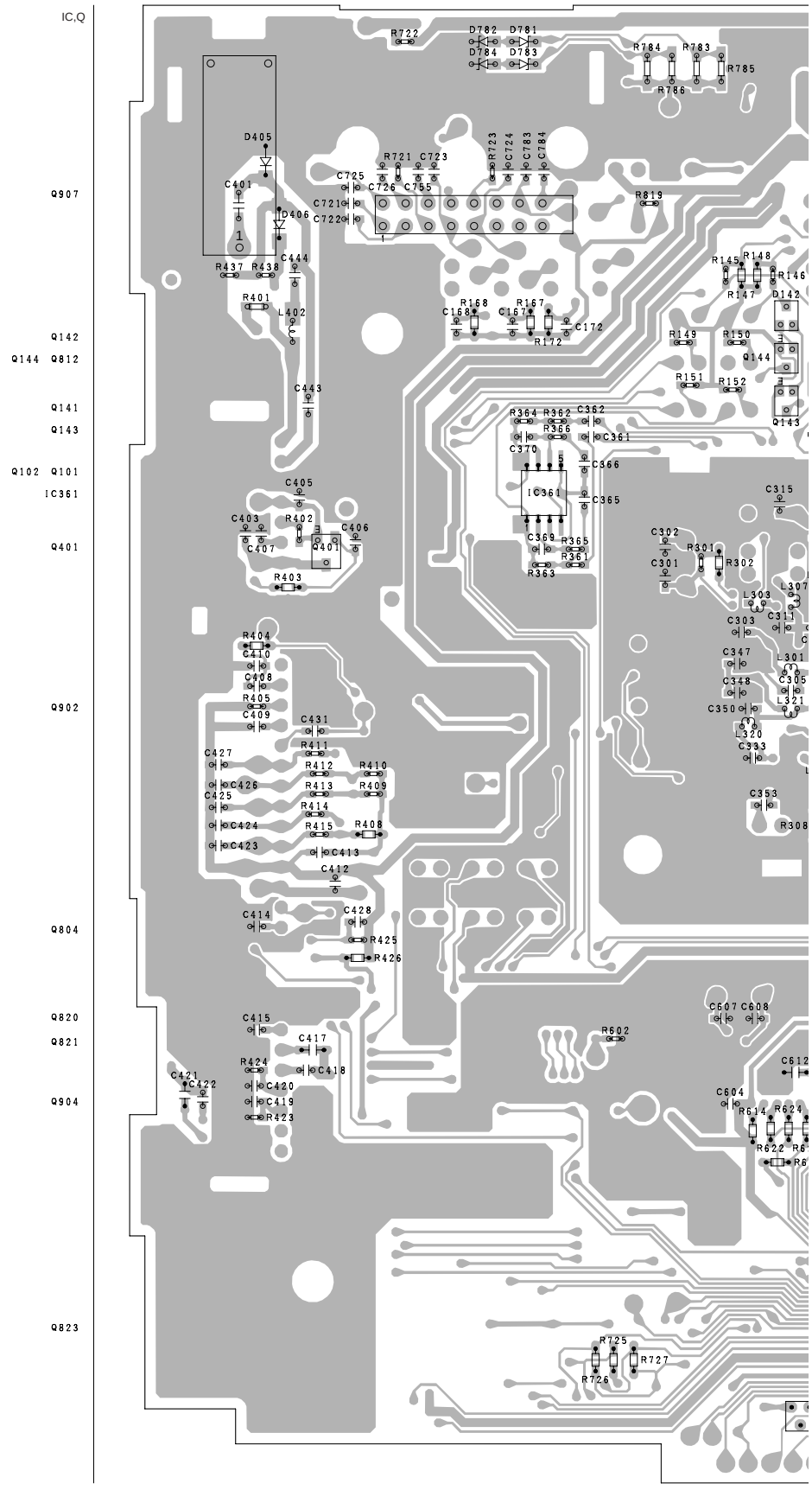
Q824

Q825

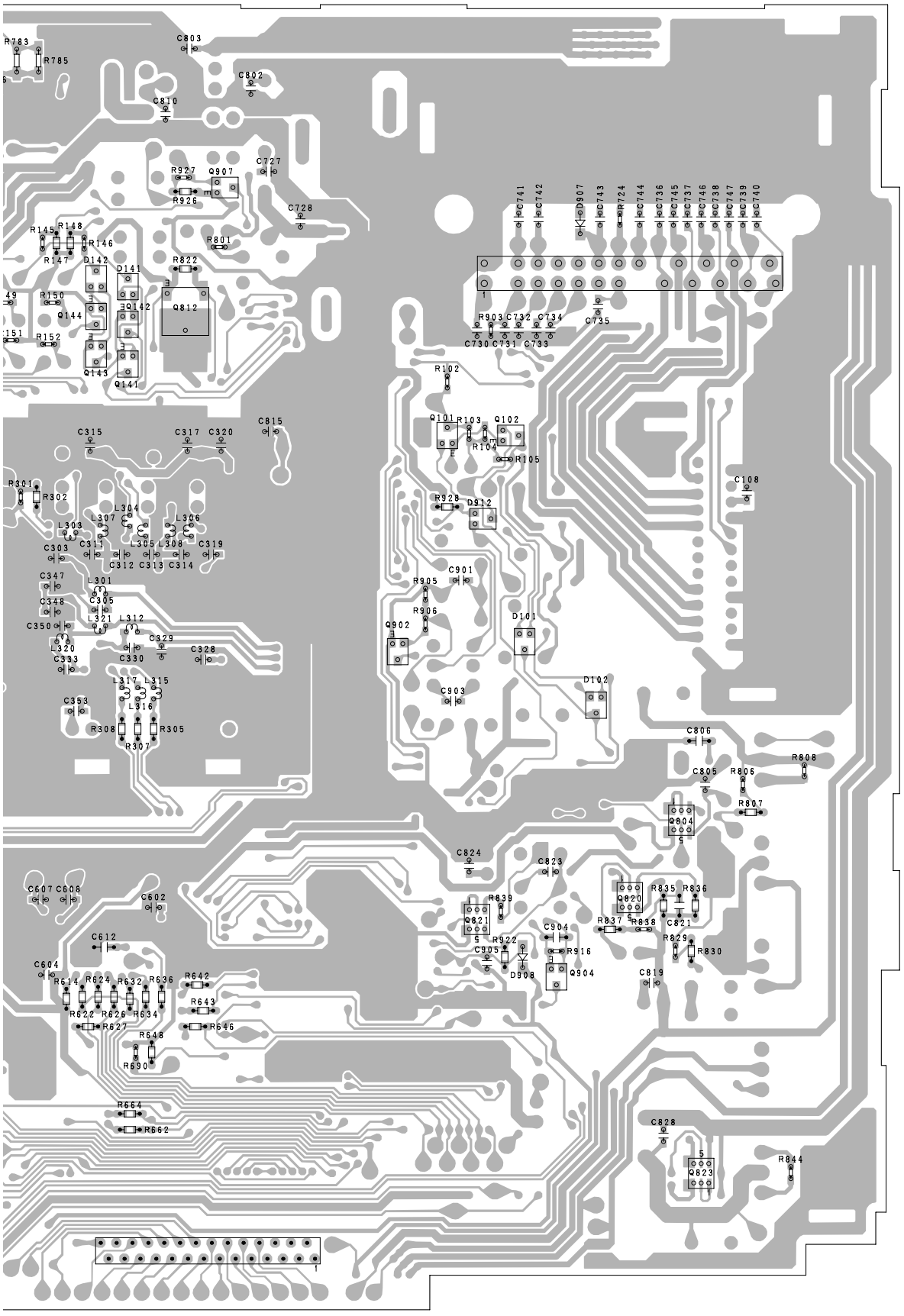
IC721

A

A TUNER AMP UNIT



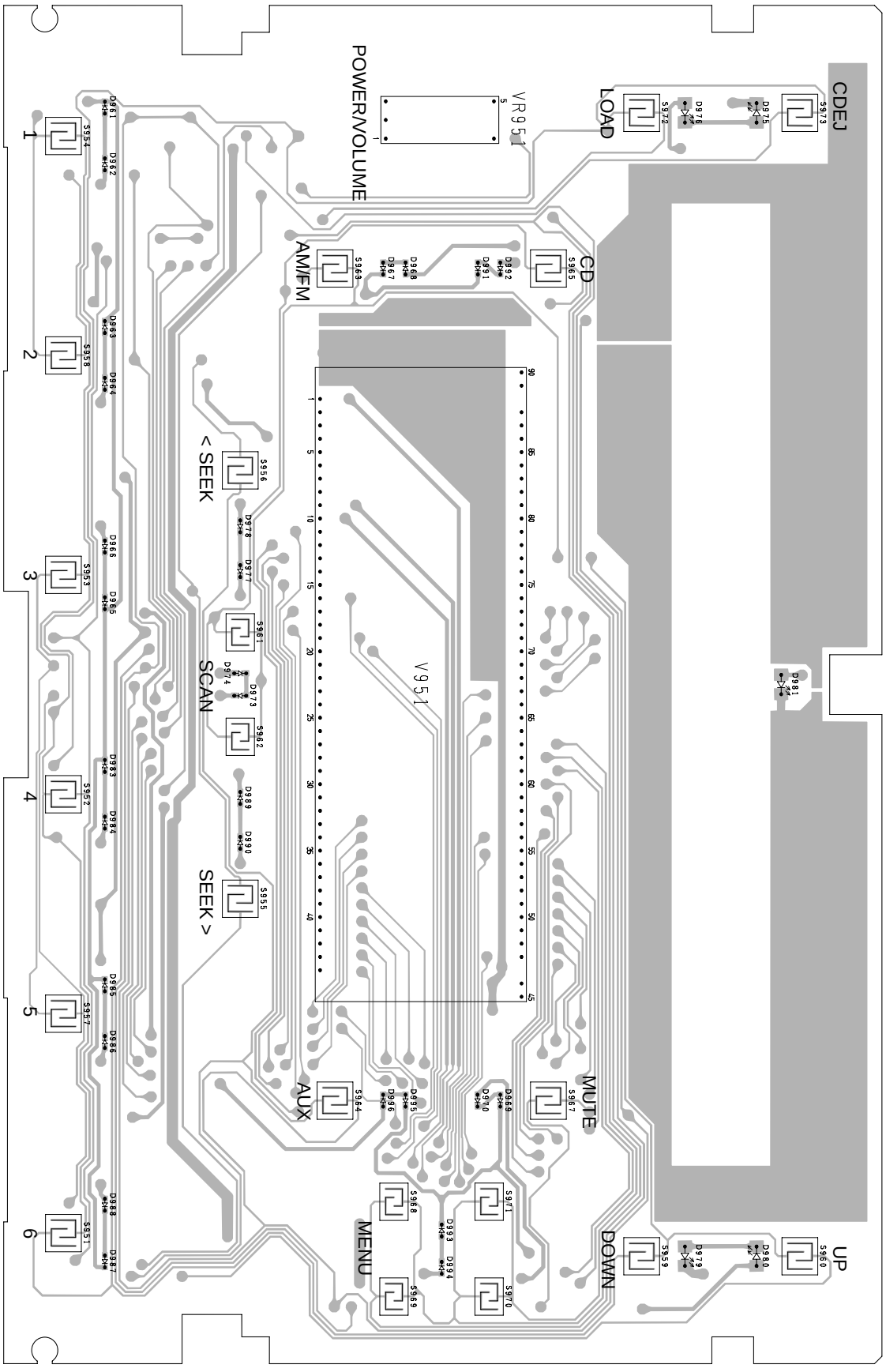
SIDE B


C803
C802
C810
C727
R927
Q907
R926
C728
R801
R822
R145
R148
R146
R147
D142
D141
R150
Q144
Q142
Q812
R152
Q143
Q141
C741
C742
D907
C743
R724
C744
C736
C745
C737
C746
C738
C747
C739
C740
R903
C732
C734
C735
C730
C731
C733
R102
Q101
R103
Q102
R104
R105
C815
C315
C317
C320
R301
R302
L304
L307
L306
L303
C303
C311
L305
L308
C319
C312
C313
C314
C347
L301
C305
C348
L321
L312
C350
C329
L320
C330
C328
C333
L317
L315
C353
L316
R308
R305
R307
C108
R928
D912
C901
R905
R906
Q902
D101
C903
D102
C806
C805
R806
R808
R807
Q804
C824
C823
C607
C608
C602
R839
Q821
Q820
R835
R836
R837
R838
C821
C904
R829
R830
C612
R922
C905
D908
R916
Q904
C819
C604
R614
R624
R632
R636
R642
R622
R626
R634
R643
R627
R646
R648
R690
R654
R662
C828
Q823
R844

4.2 KEYBOARD UNIT

B KEYBOARD UNIT

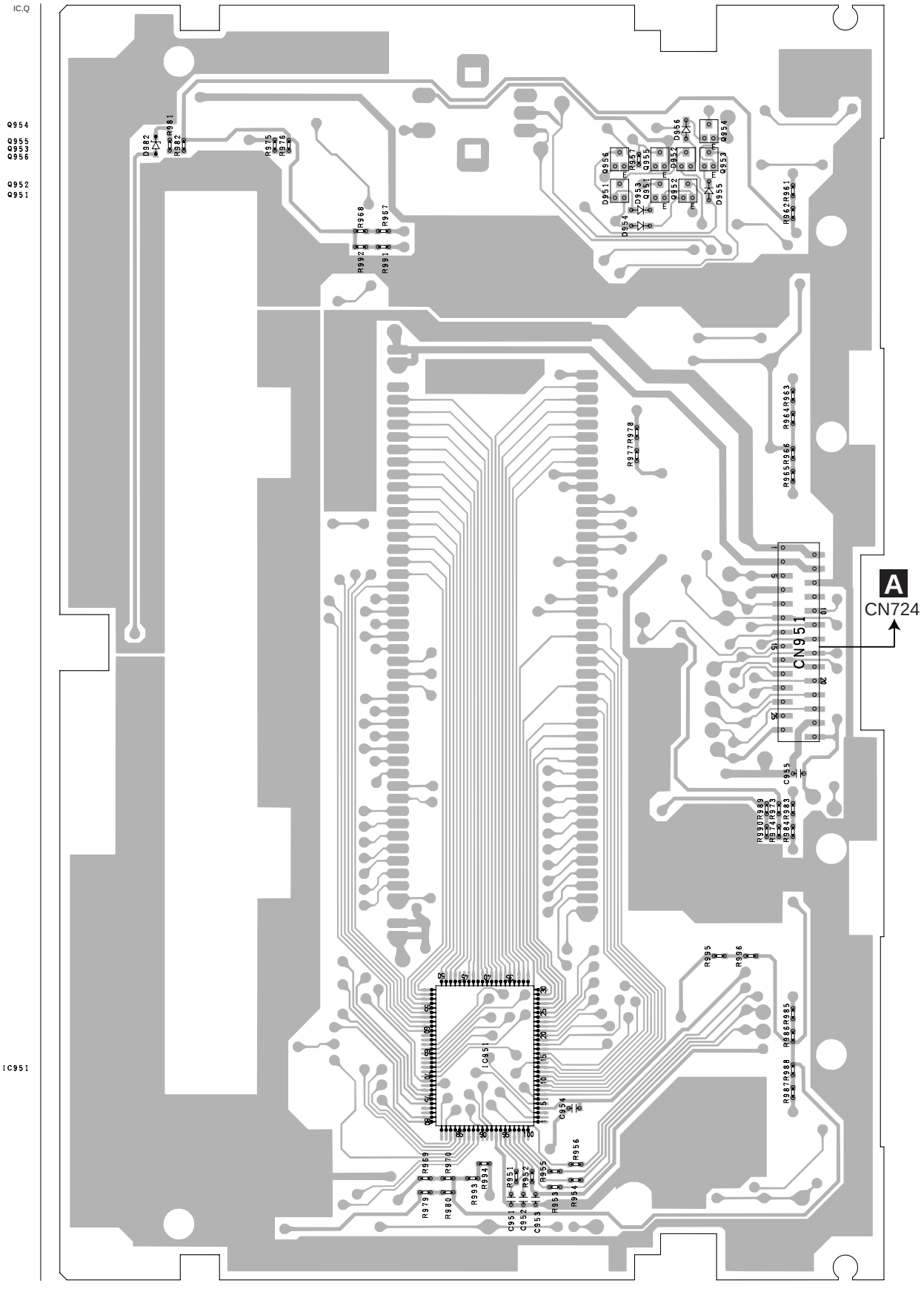
SIDE A



B

B KEYBOARD UNIT

SIDE B

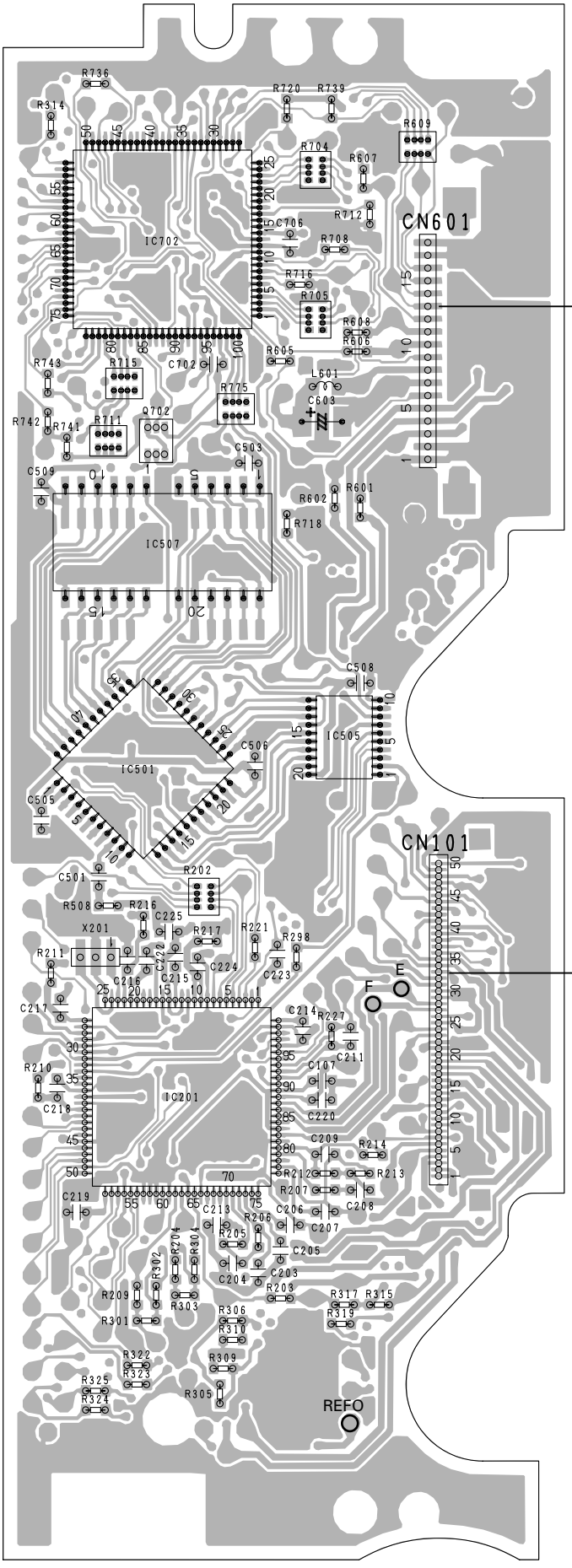


B

4.3 CD MECHANISM MODULE

C CONTROL UNIT (G2F)

SIDE A



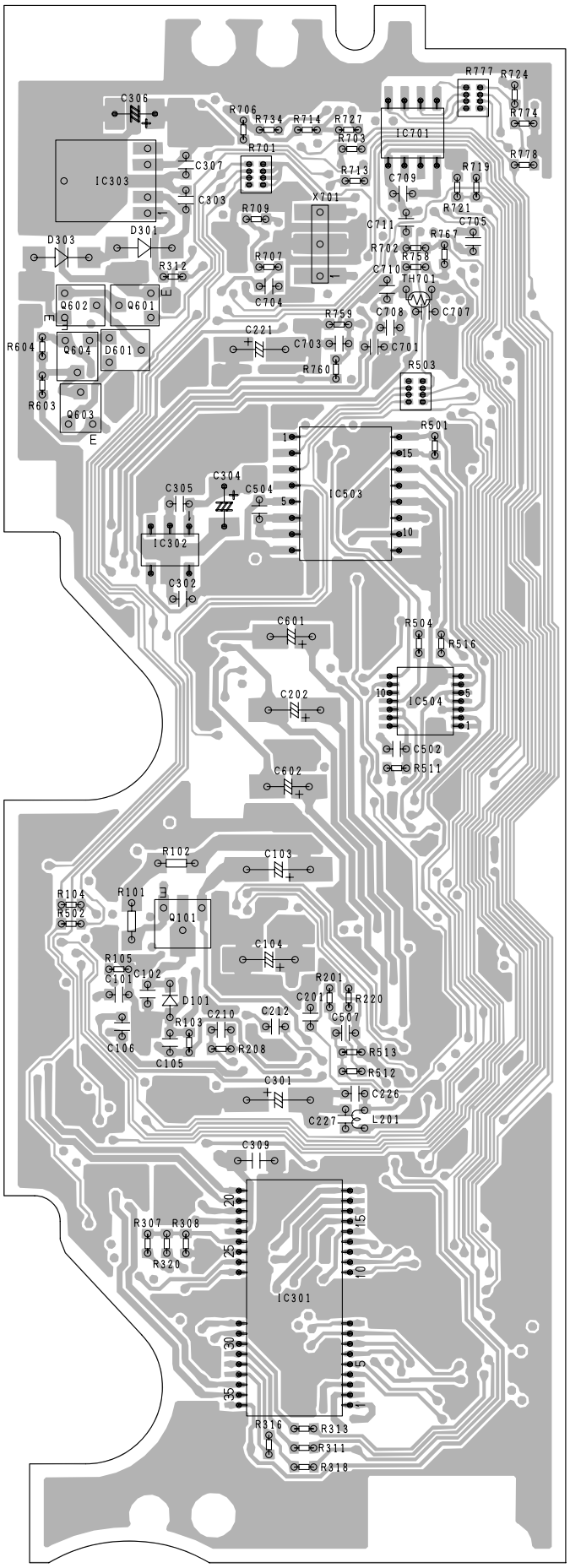
A CN725

F CN11

C

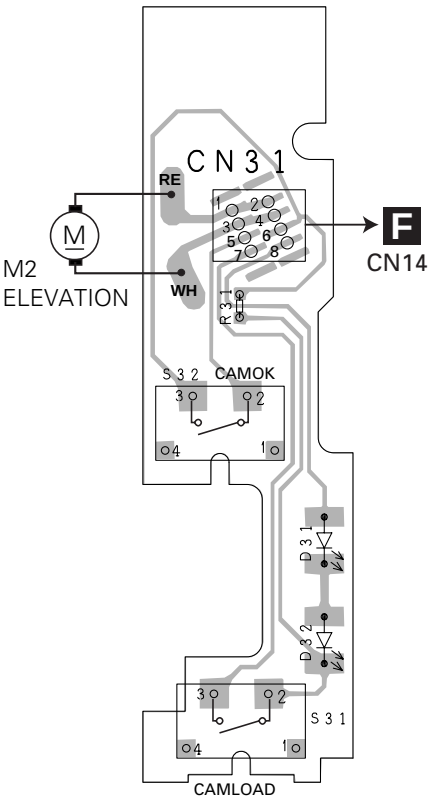
C CONTROL UNIT (G2F)

SIDE B

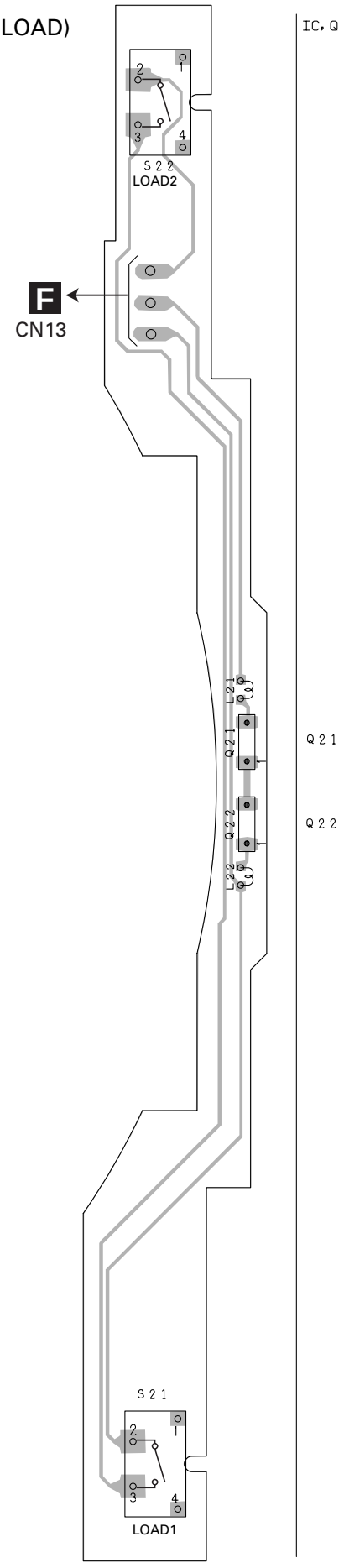


A B C D E F

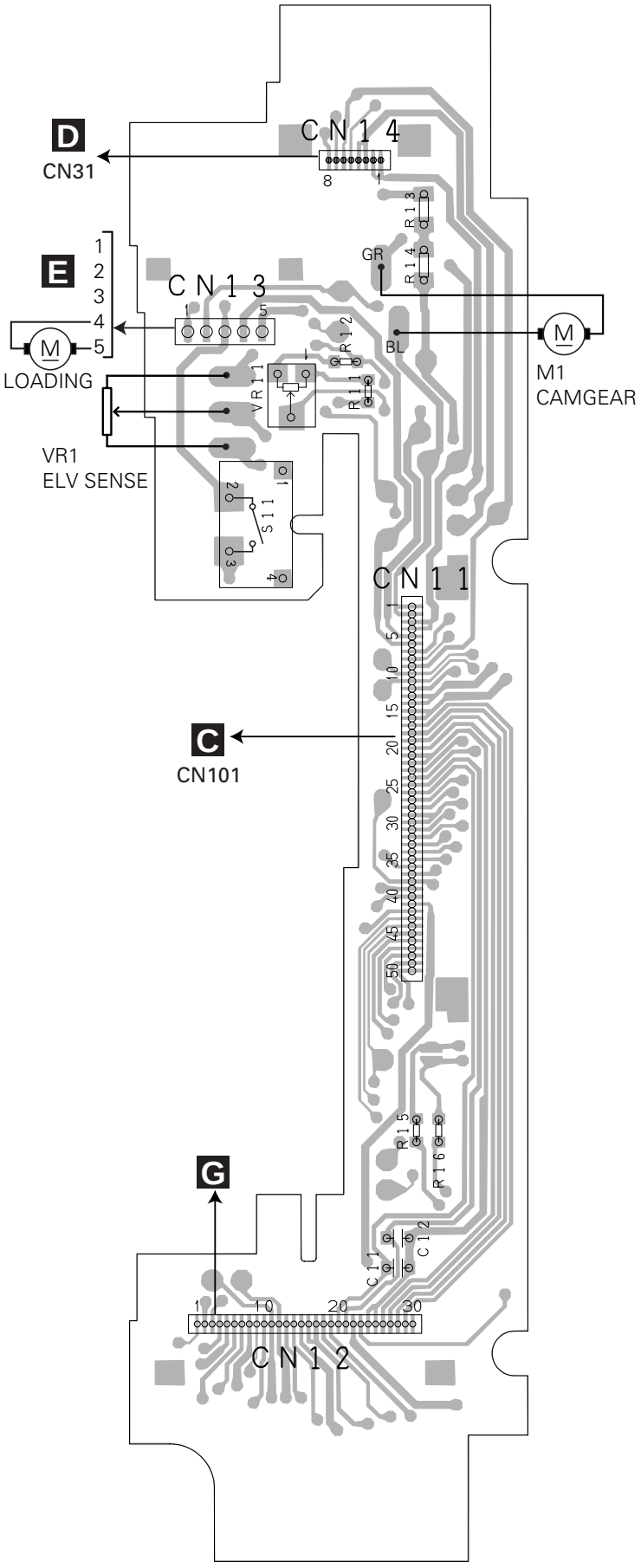
D PCB UNIT (LED)



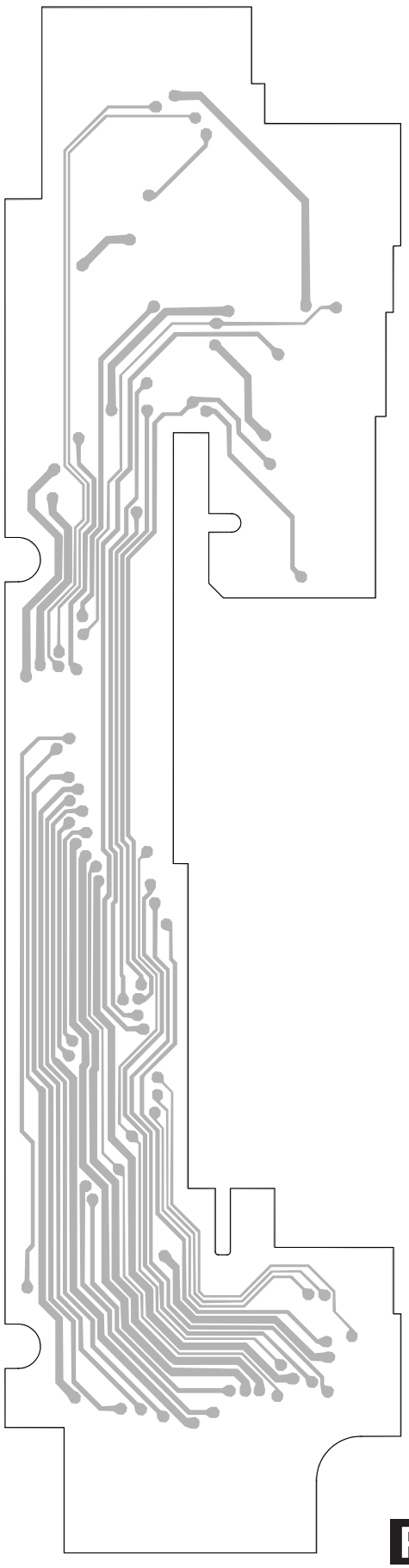
E PCB UNIT (LOAD)



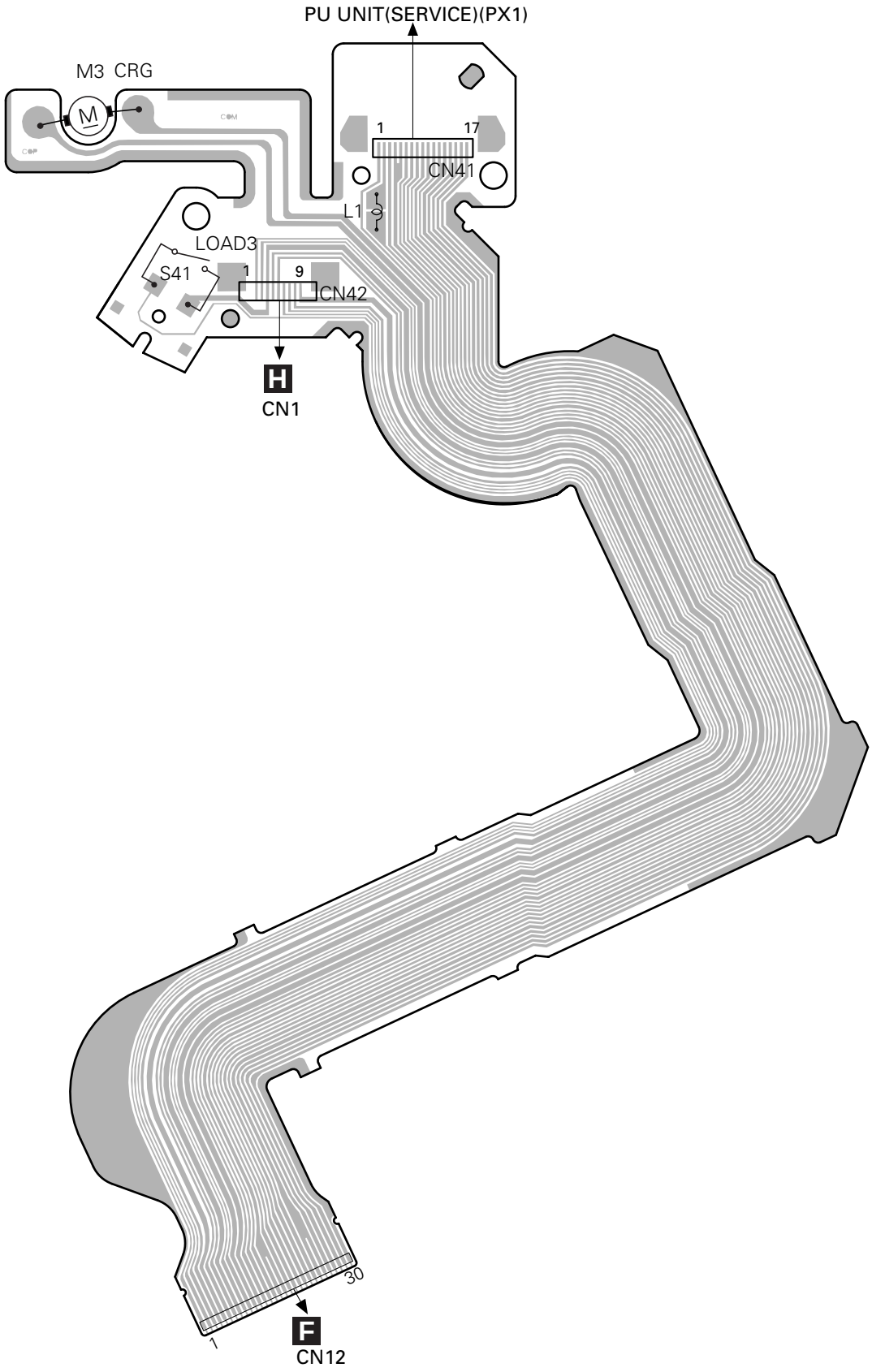
F PCB UNIT (SIDE) SIDE A



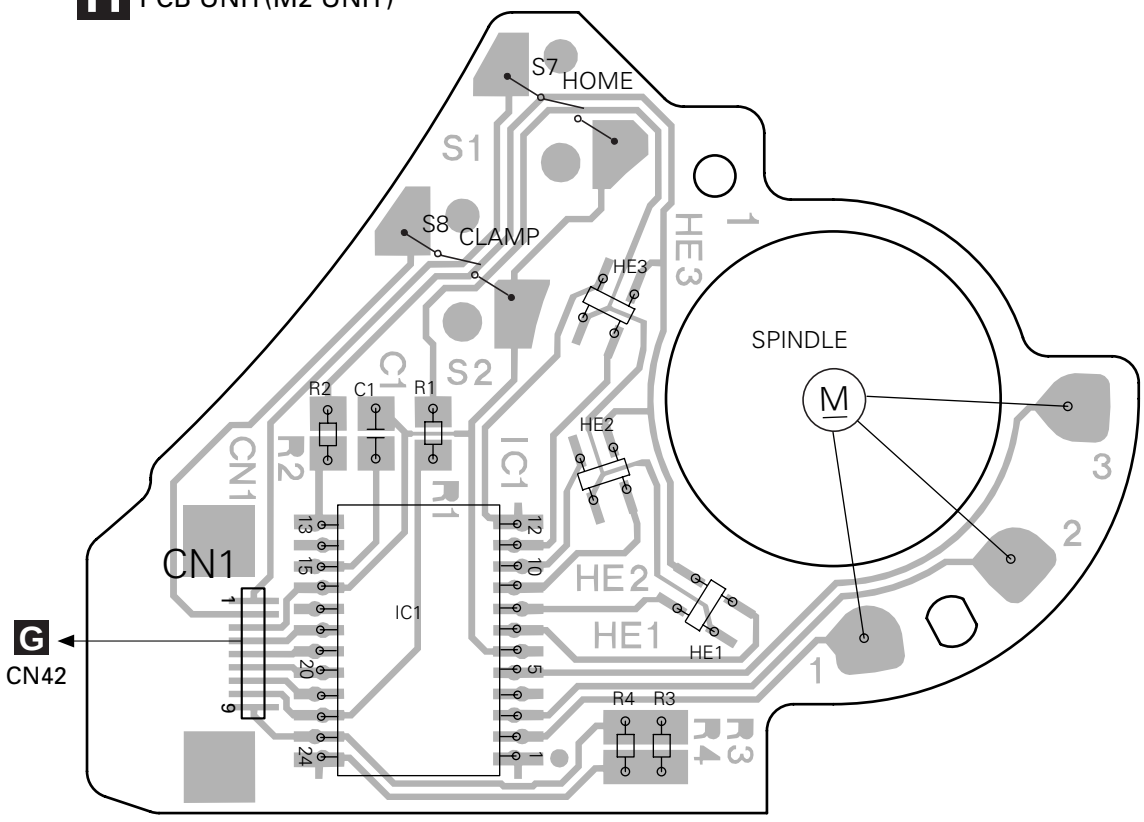
F PCB UNIT (SIDE) SIDE B



G PCB UNIT


PU UNIT(SERVICE)(PX1)
M3 CRG
M
1
17
CN41
L1
LOAD3
S41
1
9
CN42
H
CN1
30
1
F
CN12

H PCB UNIT(M2 UNIT)



5. ELECTRICAL PARTS LIST

NOTE:

- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*

Chip Resistor

RS1/◯S◯◯◯J,RS1/◯◯S◯◯◯J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

A

Unit Number:CWM8869

Unit Name:Tuner Amp Unit

MISCELLANEOUS

Circuit Symbol and No.		Part No.
IC 101	IC	TDA7384
IC 102	IC	NJM2903V
IC 103	IC	NJM2903V
IC 161	IC	NJM4558V
IC 162	IC	NJM4558V
IC 182	IC	TC4066BF
IC 301	IC	PM2010A
IC 361	IC	NJM4558MD
IC 362	IC	NJM4558MD
IC 431	IC	HA12181FP
IC 601	IC	PD5872B
IC 602	IC	S-80843CNUA-B84
IC 603	IC	PDH069C
IC 721	IC	TC7S86FU
IC 781	IC	TJA1041T
IC 901	IC	NJM2903V
Q 101	Transistor	DTC124EU
Q 102	Transistor	DTC124EU
Q 103	Transistor	IMD3A
Q 141	Transistor	DTC323TU
Q 142	Transistor	DTC323TU
Q 143	Transistor	DTC323TU
Q 144	Transistor	DTC323TU
Q 145	Transistor	DTA124EU
Q 146	Transistor	DTA124EU
Q 181	Transistor	IMD3A
Q 401	Transistor	2SC2712
Q 781	Transistor	2SC4081
Q 804	Transistor	IMD3A
Q 805	Transistor	2SD2375
Q 806	Transistor	2SA1576
Q 807	Transistor	2SB1238
Q 808	Transistor	DTC124EU
Q 809	Transistor	2SB1185
Q 810	Transistor	IMX1
Q 811	Transistor	2SC2712
Q 812	Transistor	2SB1184F5
Q 813	Transistor	IMX1
Q 814	Transistor	2SB1185
Q 815	Transistor	IMX1
Q 816	Transistor	IMD3A
Q 817	Transistor	2SD2375
Q 818	Transistor	2SD2375
Q 819	Transistor	2SB1132
Q 820	Transistor	IMX1
Q 821	Transistor	IMD3A
Q 822	Transistor	2SD1859
Q 823	Transistor	IMD3A
Q 824	Transistor	2SB1185
Q 825	Transistor	IMX1
Q 826	Transistor	DTC124EU
Q 901	Transistor	2SC4081
Q 902	Transistor	2SC4081
Q 904	Transistor	DTC114TU
Q 905	Transistor	DTA124EU
Q 906	Transistor	2SC4081
Q 907	Transistor	2SC4081
D 101	Diode	DAP202U
D 102	Diode	DAP202U
D 141	Diode	DAP202U
D 142	Diode	DAP202U
D 405	Diode	RR264M-400
D 406	Diode	RR264M-400
D 781	Diode	UDZS27(B)
D 782	Diode	UDZS27(B)
D 783	Diode	UDZS27(B)
D 784	Diode	UDZS27(B)
D 801	Diode	P300JL-5001
D 805	Diode	MPG06G-6415G3
D 806	Diode	HZS6L(A3)
D 807	Diode	HZS9L(A1)
D 808	Diode	HZU4R7(B3)
D 809	Diode	HZU2R7(B1)
D 810	Diode	HZU3R6(B2)
D 811	Diode	HZS12L(B1)
D 812	Diode	HZS9L(A3)
D 901	Diode	HZS7L(C2)
D 902	Diode	1SS133
D 903	Diode	HZS9L(A2)
D 904	Diode	1SS355
D 906	Diode	HZS12L(C1)
D 907	Diode	1SS355
D 908	Diode	1SS355
D 909	Diode	1SS355
D 910	Diode	1SS355
D 911	Diode	HZS6L(B1)
D 912	Diode	DAN202U
D 913	Diode	HZS9L(B2)
D 914	Diode	1SS355

Circuit Symbol and No.		Part No.
D 915	Diode	1SS355
L 301	Inductor	CTF1379
L 303	Inductor	CTF1379
L 304	Inductor	CTF1379
L 305	Inductor	CTF1379
L 306	Inductor	CTF1379
L 307	Inductor	CTF1379
L 308	Inductor	CTF1379
L 309	Inductor	CTF1379
L 310	Inductor	CTF1379
L 311	Inductor	CTF1379
L 312	Inductor	CTF1379
L 313	Inductor	CTF1379
L 314	Inductor	CTF1379
L 315	Inductor	CTF1379
L 316	Inductor	CTF1379
L 317	Inductor	CTF1379
L 318	Inductor	CTF1379
L 319	Inductor	CTF1379
L 320	Inductor	CTF1379
L 321	Inductor	CTF1379
L 322	Inductor	LCTA2R2J2520
L 323	Inductor	LCTA2R2J2520
L 324	Inductor	LCTA2R2J2520
L 325	Inductor	LCTA2R2J2520
L 401	Coil	CTB1112
L 402	Inductor	LCTA4R7J2520
L 403	Inductor	LCTA1R0J2520
L 404	Inductor	LCTA2R2J2520
L 431	Inductor	LCYC4R7K2125
L 601	Inductor	LCTA2R2J2520
L 721	Inductor	CTF1449
L 722	Inductor	LCTA2R2J2520
L 801	Choke Coil 600µH	CTH1221
L 802	Inductor	CTF1449
X 301	Radiator 33.8688MHz	CSS1595
X 601	Radiator 32.768kHz	CSS1319
X 602	Radiator 16.000MHz	CSS1571
FU721	Fuse 3A	CEK1286
AR401	Surge Protector	DSP-201M-S00B
	FM/AM Tuner Unit	CWE1774

RESISTORS

R 101	RS1/16S103J
R 102	RS1/16S103J
R 103	RS1/16S221J
R 104	RS1/16S153J
R 105	RS1/16S101J
R 107	RS1/16S223J
R 108	RS1/16S223J
R 109	RS1/16S103J
R 110	RS1/16S103J
R 111	RS1/16S124J
R 112	RS1/16S124J
R 113	RS1/16S474J
R 114	RS1/16S474J
R 115	RS1/16S103J
R 116	RS1/16S103J
R 117	RS1/16S223J
R 118	RS1/16S223J
R 119	RS1/16S103J
R 120	RS1/16S103J
R 121	RS1/16S124J
R 122	RS1/16S124J
R 123	RS1/16S474J
R 124	RS1/16S474J
R 125	RS1/16S103J
R 126	RS1/16S103J
R 127	RS1/16S224J
R 128	RS1/16S822J
R 141	RS1/16S102J
R 142	RS1/16S102J
R 143	RS1/16S102J
R 144	RS1/16S102J
R 145	RS1/16S102J
R 146	RS1/16S102J
R 147	RS1/16S222J
R 148	RS1/16S222J
R 149	RS1/16S104J
R 150	RS1/16S104J
R 151	RS1/16S104J
R 152	RS1/16S104J
R 161	RS1/16S683J
R 162	RS1/16S683J
R 163	RS1/16S683J
R 164	RS1/16S683J
R 165	RS1/16S273J
R 166	RS1/16S273J
R 167	RS1/16S273J
R 168	RS1/16S273J
R 169	RS1/16S683J
R 170	RS1/16S683J
R 171	RS1/16S273J
R 172	RS1/16S273J
R 181	RS1/16S103J
R 182	RS1/16S103J
R 301	RS1/16S225J
R 302	RS1/16S101J
R 303	RS1/16S471J
R 304	RS1/16S471J
R 305	RS1/16S471J
R 307	RS1/16S471J
R 308	RS1/16S471J
R 309	RS1/16S471J
R 310	RS1/16S471J
R 311	RS1/16S332J
R 312	RS1/16S332J
R 313	RS1/16S0R0J
R 314	RS1/16S0R0J
R 315	RS1/16S0R0J
R 316	RS1/16S0R0J
R 317	RS1/16S0R0J
R 361	RS1/16S473J
R 362	RS1/16S473J
R 363	RS1/16S473J
R 364	RS1/16S473J
R 365	RS1/16S473J
R 366	RS1/16S473J
R 367	RS1/16S473J

Circuit Symbol and No.	Part No.	Circuit Symbol and No.	Part No.
R 368	RS1/16S473J	R 627	RS1/16S473J
R 369	RS1/16S473J	R 628	RS1/16S471J
R 370	RS1/16S473J	R 629	RS1/16S102J
R 371	RS1/16S473J	R 630	RS1/16S102J
R 372	RS1/16S473J	R 631	RS1/16S473J
R 401	RS1/10S222J	R 632	RS1/16S471J
R 403	RS1/16S222J	R 633	RS1/16S682J
R 404	RS1/16S473J	R 634	RS1/16S471J
R 405	RS1/16S473J	R 635	RS1/16S682J
R 406	RS1/16S473J	R 636	RS1/16S471J
R 407	RS1/16S473J	R 637	RS1/16S682J
R 408	RS1/16S473J	R 638	RS1/16S0R0J
R 409	RS1/16S472J	R 639	RS1/16S0R0J
R 410	RS1/16S473J	R 640	RS1/16S0R0J
R 411	RS1/16S681J	R 641	RS1/16S0R0J
R 412	RS1/16S681J	R 642	RS1/16S471J
R 413	RS1/16S681J	R 643	RS1/16S471J
R 414	RS1/16S103J	R 644	RS1/16S0R0J
R 415	RS1/16S681J	R 645	RS1/16S471J
R 417	RS1/16S272J	R 646	RS1/16S0R0J
R 418	RS1/16S272J	R 647	RS1/16S471J
R 419	RS1/16S162J	R 648	RS1/16S473J
R 420	RS1/16S162J	R 649	RAB4C471J
R 421	RS1/16S681J	R 650	RAB4C472J
R 422	RS1/16S681J	R 655	RS1/16S471J
R 425	RS1/16S393J	R 656	RS1/16S471J
R 426	RS1/16S473J	R 657	RS1/16S102J
R 431	RS1/16S473J	R 658	RS1/16S102J
R 432	RS1/16S223J	R 659	RS1/16S473J
R 433	RS1/16S184J	R 660	RAB4C102J
R 435	RS1/16S104J	R 661	RAB4C473J
R 436	RS1/16S123J	R 662	RS1/16S471J
R 437	RS1/16S225J	R 663	RS1/16S473J
R 438	RS1/16S225J	R 664	RS1/16S102J
R 601	RS1/16S104J	R 665	RS1/16S473J
R 602	RS1/16S473J	R 666	RAB4C102J
R 603	RS1/16S102J	R 667	RS1/16S102J
R 604	RS1/16S102J	R 668	RS1/16S471J
R 605	RS1/16S471J	R 669	RS1/16S471J
R 606	RS1/16S471J	R 670	RS1/16S0R0J
R 607	RS1/16S471J	R 672	RS1/16S104J
R 608	RS1/16S472J	R 673	RS1/16S0R0J
R 609	RS1/16S102J	R 674	RS1/16S102J
R 610	RS1/16S0R0J	R 675	RS1/16S0R0J
R 611	RS1/16S0R0J	R 676	RS1/16S0R0J
R 612	RS1/16S102J	R 677	RS1/16S0R0J
R 613	RS1/16S101J	R 678	RS1/16S0R0J
R 614	RS1/16S473J	R 679	RS1/16S102J
R 615	RS1/16S0R0J	R 680	RS1/16S471J
R 616	RS1/16S473J	R 681	RS1/16S0R0J
R 617	RS1/16S471J	R 682	RS1/16S0R0J
R 618	RS1/16S473J	R 683	RS1/16S102J
R 619	RS1/16S471J	R 684	RS1/16S103J
R 620	RS1/16S102J	R 685	RS1/16S473J
R 621	RS1/16S473J	R 686	RS1/16S473J
R 622	RS1/16S471J	R 690	RS1/16S473J
R 623	RS1/16S682J	R 691	RS1/16S0R0J
R 624	RS1/16S471J	R 692	RS1/16S473J
R 625	RS1/16S682J	R 693	RS1/16S473J
R 626	RS1/16S471J	R 721	RS1/16S0R0J

Circuit Symbol and No.	Part No.
R 722	RS1/16S0R0J
R 723	RS1/16S0R0J
R 724	RS1/16S0R0J
R 725	RS1/16S473J
R 726	RS1/16S223J
R 727	RS1/16S223J
R 728	RS1/16S473J
R 729	RS1/16S473J
R 730	RS1/16S222J
R 731	RS1/16S222J
R 733	RS1/16S102J
R 734	RS1/16S102J
R 735	RS1/16S332J
R 736	RS1/16S332J
R 737	RS1/16S102J
R 781	RS1/16S473J
R 787	RS1/16S223J
R 788	RS1/16S223J
R 806	RS1/16S561J
R 807	RS1/16S561J
R 808	RS1/16S223J
R 809	RS1/16S473J
R 810	RS1/16S332J
R 811	RD1/4PU821J
R 812	RD1/4PU821J
R 813	RS1/16S332J
R 814	RS1/16S391J
R 815	RS1/16S223J
R 816	RS1/16S471J
R 817	RS1/16S102J
R 818	RS1/16S681J
R 819	RS1/16S102J
R 820	RS1/16S332J
R 821	RS1/16S391J
R 822	RS1/16S223J
R 823	RS1/16S471J
R 824	RS1/16S121J
R 825	RS1/16S105J
R 826	RS1/16S681J
R 827	RS1/16S152J
R 828	RS1/16S222J
R 829	RS1/16S102J
R 830	RS1/16S102J
R 831	RS2LMF4R7J
R 833	RD1/4PU3R3J
R 834	RD1/4PU3R3J
R 835	RS1/16S105J
R 836	RS1/16S681J
R 837	RS1/16S392J
R 838	RS1/16S242J
R 839	RS1/16S681J
R 840	RS1/16S1R0J
R 841	RS1/16S332J
R 842	RS1/16S101J
R 843	RS1/16S101J
R 844	RS1/16S223J
R 845	RS1/16S101J
R 846	RS1/16S101J
R 847	RS1/16S471J
R 848	RS1/16S102J

Circuit Symbol and No.	Part No.
R 901	RS1/16S473J
R 902	RS1/16S473J
R 903	RS1/16S103J
R 904	RD1/4PU102J
R 905	RS1/16S223J
R 906	RS1/16S473J
R 907	RS1/16S102J
R 908	RS1/16S103J
R 909	RS1/16S103J
R 910	RS1/16S105J
R 911	RD1/4PU182J
R 912	RD1/4PU102J
R 913	RS1/16S104J
R 914	RS1/16S473J
R 915	RS1/16S473J
R 916	RS1/16S473J
R 917	RS1/16S473J
R 918	RS1/16S682J
R 920	RAB4C102J
R 921	RS1/16S102J
R 922	RS1/16S332J
R 923	RS1/16S102J
R 924	RS1/16S103J
R 925	RS1/16S472J
R 926	RS1/16S223J
R 927	RS1/16S473J
R 928	RS1/16S472J
R 929	RS1/16S102J
R 930	RS1/16S103J
R 931	RS1/16S473J
R 932	RS1/16S273J
R 933	RS1/16S223J
R 934	RS1/16S102J
R 935	RS1/16S102J
R 936	RS1/16S0R0J

CAPACITORS

C 101	CEJQ1R0M50
C 102	CEJQ100M16
C 103	CFTNA224J50
C 104	CFTNA224J50
C 105	CFTNA224J50
C 106	CFTNA224J50
C 107	CFTNA105J50
C 108	CKSRYB104K16
C 109	CEJQ330M16
C 110	CKSRYB103K50
C 111	CEJQR47M50
C 112	CKSRYB103K50
C 141	CEJQNP100M10
C 142	CEJQNP100M10
C 143	CEJQNP100M10
C 144	CEJQNP100M10
C 145	CEJQ220M6R3
C 146	CEJQ220M6R3
C 161	CEJQ1R0M50
C 162	CEJQ1R0M50
C 163	CEJQ1R0M50
C 164	CEJQ1R0M50

Circuit Symbol and No.	Part No.	Circuit Symbol and No.	Part No.
C 165	CCSRCH470J50	C 368	CCSRCH271J50
C 166	CCSRCH470J50	C 369	CCSRCH560J50
C 167	CCSRCH470J50	C 370	CCSRCH560J50
C 168	CCSRCH470J50	C 371	CCSRCH560J50
C 169	CKSRYB473K50	C 372	CCSRCH560J50
C 170	CKSRYB473K50	C 401	CKSYB103K50
C 171	CCSRCH471J50	C 402	CEJQ220M10
C 172	CCSRCH471J50	C 403	CKSRYB103K50
C 301	CCSRCH100D50	C 405	CKSRYB103K50
C 302	CCSRCH100D50	C 406	CKSRYB103K50
C 303	CKSRYB104K16	C 407	CKSRYB103K50
C 304	CEJQ220M6R3	C 408	CKSRYB682K50
C 305	CKSRYB104K16	C 409	CKSRYB102K50
C 306	CEJQ101M6R3	C 410	CKSRYB332K50
C 307	CEJQNP3R3M25	C 411	CEJQ101M6R3
C 308	CEJQNP3R3M25	C 412	CKSRYB473K50
C 309	CEJQNP3R3M25	C 414	CKSRYB102K50
C 310	CEJQNP3R3M25	C 415	CKSRYB102K50
C 311	CKSRYB104K16	C 417	CKSRYB183K50
C 312	CKSRYB104K16	C 418	CKSRYB183K50
C 313	CKSRYB104K16	C 419	CKSRYB182K50
C 314	CKSRYB104K16	C 420	CKSRYB331K50
C 315	CKSRYB104K16	C 428	CKSRYB472K50
C 316	CEJQ220M6R3	C 431	CKSRYB102K50
C 317	CKSRYB104K16	C 432	CKSQYB334K16
C 318	CEJQ220M6R3	C 433	CKSRYB472K50
C 319	CKSRYB104K16	C 434	CKSRYB332K50
C 320	CKSRYB104K16	C 435	CKSRYB333K25
C 322	CKSRYB104K16	C 436	CEAL101M10
C 323	CKSRYB104K16	C 437	CEAL3R3M50
C 324	CKSRYB104K16	C 438	CKSRYB333K25
C 327	CASA100M6R3	C 439	CKSRYB683K16
C 328	CKSRYB104K16	C 440	CKSRYB333K25
C 330	CKSRYB104K16	C 441	CKSRYB333K25
C 331	CKSRYB102K50	C 442	CKSYB474K16
C 332	CEJQ220M6R3	C 443	CKSQYB103K50
C 333	CKSRYB104K16	C 444	CKSQYB103K50
C 335	CEJQ3R3M50	C 601	CKSRYB104K16
C 336	CEJQ3R3M50	C 603	CEJQ100M16
C 337	CEJQ3R3M50	C 604	CKSRYB102K50
C 338	CEJQ3R3M50	C 605	CCSRCH180J50
C 339	CEJQ3R3M50	C 606	CCSRCH220J50
C 340	CEJQ3R3M50	C 607	CCSRCH200J50
C 341	CKSRYB474K10	C 608	CCSRCH180J50
C 342	CKSRYB104K16	C 609	CKSRYB104K16
C 343	CKSRYB222K50	C 611	CKSRYB473K50
C 344	CKSRYB222K50	C 721	CKSRYB102K50
C 345	CEJQ220M6R3	C 722	CKSRYB102K50
C 346	CEJQ220M6R3	C 723	CKSRYB102K50
C 347	CKSRYB104K16	C 724	CKSRYB102K50
C 348	CKSRYB104K16	C 725	CKSRYB102K50
C 349	CEJQ220M6R3	C 726	CKSRYB102K50
C 353	CKSRYB105K10	C 730	CKSRYB473K50
C 361	CKSRYB105K10	C 731	CKSRYB473K50
C 362	CKSRYB105K10	C 732	CKSRYB102K50
C 363	CKSRYB105K10	C 733	CKSRYB102K50
C 364	CKSRYB105K10	C 734	CKSRYB102K50
C 365	CCSRCH271J50	C 735	CKSRYB103K50
C 366	CCSRCH271J50	C 736	CKSRYB102K50
C 367	CCSRCH271J50	C 737	CKSRYB102K50

Circuit Symbol and No.	Part No.
C 738	CKSRYB102K50
C 739	CKSRYB102K50
C 740	CKSRYB102K50
C 741	CKSRYB102K50
C 742	CKSRYB102K50
C 743	CKSRYB103K50
C 744	CKSRYB103K50
C 745	CKSRYB102K50
C 746	CKSRYB102K50
C 747	CKSRYB102K50
C 748	CCSRCH681J50
C 749	CCSRCH681J50
C 750	CKSRYB104K16
C 751	CEJQ100M16
C 781	CEJQ100M16
C 782	CKSRYB223K50
C 783	CCSRCH101J50
C 784	CCSRCH101J50
C 801	CEAT332M16
C 804	CEHAT102M16
C 805	CKSRYB473K50
C 806	CKSRYB104K16
C 807	CEAT221M6R3
C 808	CKSRYB223K50
C 809	CEAT101M10
C 810	CKSRYB102K50
C 811	CEJQ100M16
C 812	CEAT331M6R3
C 813	CKSRYB223K50
C 814	CEJQ101M6R3
C 815	CKSRYB102K50
C 816	CKSRYB472K50
C 817	CEAT101M10
C 818	CKSRYB473K50
C 819	CKSRYB473K50
C 820	CEJQ100M16
C 821	CKSRYB472K50
C 822	CEAT101M16
C 823	CKSRYB473K50
C 824	CKSRYB473K50
C 825	CEJQ100M16
C 826	CKSRYB223K50
C 827	CEAT471M16
C 828	CKSRYB102K50
C 901	CKSRYB473K50
C 902	CKSRYB472K50
C 903	CCSRCH181J50
C 904	CKSRYB102K50
C 905	CKSRYB104K16
C 906	CKSRYB473K50
C 907	CCSRCH221J50
C 908	CKSRYB103K50
C 909	CKSRYB473K50
C 910	CKSRYB103K50
C 911	CKSRYB473K50
C 912	CKSRYB472K50

B

Unit Number:CWM8873

Circuit Symbol and No.	Part No.

Unit Name:Keyboard Unit

MISCELLANEOUS

IC 951	IC	LC75750EHS
Q 951	Transistor	DTC124EU
Q 952	Transistor	DTC124EU
Q 953	Transistor	DTC124EU
Q 954	Transistor	DTC124EU
Q 955	Transistor	DTC124EU
Q 956	Transistor	DTA114EU
D 951	Diode	DAN202U
D 952	Diode	DAN202U
D 953	Diode	1SS355
D 954	Diode	1SS355
D 955	Diode	1SS355
D 956	Diode	1SS355
D 961	LED	SML-310PT(KL)
D 962	LED	SML-310PT(KL)
D 963	LED	SML-310PT(KL)
D 964	LED	SML-310PT(KL)
D 965	LED	SML-310PT(KL)
D 966	LED	SML-310PT(KL)
D 967	LED	SML-310PT(KL)
D 968	LED	SML-310PT(KL)
D 969	LED	SML-310PT(KL)
D 970	LED	SML-310PT(KL)
D 973	LED	SML-310PT(KL)
D 974	LED	SML-310PT(KL)
D 975	LED	SML-010PT(KL)
D 976	LED	SML-010PT(KL)
D 977	LED	SML-310PT(KL)
D 978	LED	SML-310PT(KL)
D 979	LED	SML-010PT(KL)
D 980	LED	SML-010PT(KL)
D 981	LED	SML-010PT(KL)
D 982	Diode	HZU2R2(B)
D 983	LED	SML-310PT(KL)
D 984	LED	SML-310PT(KL)
D 985	LED	SML-310PT(KL)
D 986	LED	SML-310PT(KL)
D 987	LED	SML-310PT(KL)
D 988	LED	SML-310PT(KL)
D 989	LED	SML-310PT(KL)
D 990	LED	SML-310PT(KL)
D 991	LED	SML-310PT(KL)
D 992	LED	SML-310PT(KL)
D 993	LED	SML-310PT(KL)
D 994	LED	SML-310PT(KL)
D 995	LED	SML-310PT(KL)
D 996	LED	SML-310PT(KL)
VR951	Encoder(POWER/VOLUME)	CSD1103
V 951	VF	CAW1806

RESISTORS

R 951		RS1/16S123J
R 952		RS1/16S0R0J
R 953		RS1/16S471J
R 954		RS1/16S471J
R 955		RS1/16S471J

Circuit Symbol and No.		Part No.
R 956		RS1/16S471J
R 957		RS1/16S473J
R 961		RS1/16S101J
R 962		RS1/16S151J
R 963		RS1/16S101J
R 964		RS1/16S151J
R 965		RS1/16S101J
R 966		RS1/16S151J
R 967		RS1/16S101J
R 968		RS1/16S151J
R 969		RS1/16S101J
R 970		RS1/16S151J
R 973		RS1/16S101J
R 974		RS1/16S151J
R 975		RS1/16S151J
R 976		RS1/16S181J
R 977		RS1/16S151J
R 978		RS1/16S151J
R 979		RS1/16S151J
R 980		RS1/16S181J
R 981		RS1/16S101J
R 982		RS1/16S101J
R 983		RS1/16S101J
R 984		RS1/16S151J
R 985		RS1/16S101J
R 986		RS1/16S151J
R 987		RS1/16S101J
R 988		RS1/16S151J
R 989		RS1/16S151J
R 990		RS1/16S151J
R 991		RS1/16S101J
R 992		RS1/16S151J
R 993		RS1/16S101J
R 994		RS1/16S151J
R 995		RS1/16S101J
R 996		RS1/16S151J

CAPACITORS

C 951		CCSRCH330J50
C 952		CKSRYB104K16
C 954		CKSRYB104K16

C

Unit Number:CWX2835
Unit Name:Control Unit(G2F)

MISCELLANEOUS

IC 201	IC	UPD63711GC
IC 301	IC	BD7962FM
IC 302	IC	S-818A33AUC-BGN
IC 303	IC	BA05SFP
IC 501	IC	SM5903BFP
IC 504	IC	TC74VHCT08AFT
IC 505	IC	TC74VHC541FT
IC 507	IC	MSM51V17400F6TFT
IC 702	IC	PD5890A
Q 101	Transistor	2SB1132
Q 601	Transistor	DTC114EK
Q 602	Transistor	DTA123JK
Q 603	Transistor	DTC314TK
Q 604	Transistor	DTC314TK
Q 702	Transistor	UMD3N
D 101	Diode	1SS355
D 301	Diode	S1G-6904G2P
D 303	Diode	S1G-6904G2P
D 601	Diode	MA152WA
L 201	Inductor	CTF1306
L 601	Inductor	CTF1295
TH701	Thermistor	CCX1061
X 201	Radiator 16.93MHz	CSS1581
X 701	Radiator 10.00MHz	CSS1428

RESISTORS

R 101	RS1/8S120J
R 102	RS1/8S100J
R 103	RS1/16S222J
R 104	RS1/16S102J
R 105	RS1/16S0R0J
R 201	RS1/16S104J
R 202	RAB4CQ681J
R 203	RS1/16S0R0J
R 204	RS1/16S0R0J
R 205	RS1/16S103J
R 206	RS1/16S393J
R 207	RS1/16S0R0J
R 209	RS1/16S0R0J
R 210	RS1/16S0R0J
R 211	RS1/16S0R0J
R 212	RS1/16S562J
R 213	RS1/16S153J
R 214	RS1/16S123J
R 216	RS1/16S0R0J
R 217	RS1/16S0R0J
R 220	RS1/16S471J
R 221	RS1/16S681J
R 298	RS1/16S0R0J
R 301	RS1/16S103J
R 302	RS1/16S153J
R 303	RS1/16S103J
R 304	RS1/16S103J
R 305	RS1/16S272J
R 306	RS1/16S272J
R 307	RS1/16S182J
R 308	RS1/16S272J
R 309	RS1/16S682J
R 310	RS1/16S822J
R 311	RS1/16S103J
R 312	RS1/16S681J
R 313	RS1/16S103J
R 314	RS1/16S153J
R 315	RS1/16S153J
R 316	RS1/16S153J
R 317	RS1/16S103J
R 318	RS1/16S103J
R 319	RS1/16S102J
R 320	RS1/16S392J
R 322	RS1/16S103J
R 323	RS1/16S103J

Circuit Symbol and No.	Part No.
R 324	RS1/16S103J
R 325	RS1/16S103J
R 501	RS1/16S0R0J
R 504	RS1/16S331J
R 508	RS1/16S392J
R 511	RS1/16S0R0J
R 512	RS1/16S333J
R 513	RS1/16S473J
R 516	RS1/16S331J
R 601	RS1/16S102J
R 602	RS1/16S102J
R 603	RS1/16S223J
R 604	RS1/16S223J
R 605	RS1/16S102J
R 606	RS1/16S681J
R 607	RS1/16S681J
R 608	RS1/16S102J
R 609	RAB4CQ681J
R 701	RAB4CQ104J
R 702	RS1/16S222J
R 703	RS1/16S681J
R 704	RAB4CQ222J
R 705	RAB4CQ681J
R 706	RS1/16S473J
R 707	RS1/16S473J
R 708	RS1/16S222J
R 709	RS1/16S222J
R 711	RAB4CQ104J
R 712	RS1/16S473J
R 713	RS1/16S681J
R 714	RS1/16S473J
R 715	RAB4CQ222J
R 716	RS1/16S103J
R 718	RS1/16S473J
R 719	RS1/16S104J
R 720	RS1/16S103J
R 724	RS1/16S104J
R 727	RS1/16S0R0J
R 734	RS1/16S104J
R 736	RS1/16S681J
R 739	RS1/16S473J
R 741	RS1/16S104J
R 742	RS1/16S222J
R 743	RS1/16S681J
R 758	RS1/16S822J
R 759	RS1/16S103J
R 760	RS1/16S433J
R 767	RS1/16S154J
R 775	RAB4CQ681J

CAPACITORS

C 101	CKSRYB103K25
C 102	CKSRYB104K25
C 103	CEV101M10
C 104	CEV470M6R3
C 105	CKSRYB224K16
C 106	CKSRYB224K16
C 107	CKSRYB224K16
C 201	CKSRYB104K25
C 202	CEV220M16
C 203	CKSRYB473K25
C 204	CKSRYB182K50
C 205	CKSRYB104K25
C 206	CKSRYB152K50
C 207	CKSRYB224K16
C 208	CCSRCH180J50
C 209	CCSRCK2R0C50
C 210	CCSRCH181J50
C 211	CCSRCH510J50
C 212	CKSRYB682K50
C 213	CKSRYB104K25
C 214	CKSRYB104K25
C 215	CKSRYB103K25
C 216	CKSRYB104K25
C 217	CKSRYB104K25
C 218	CKSRYB104K25
C 219	CKSRYB104K25
C 220	CKSRYB104K25
C 221	CEV470M6R3
C 222	CKSRYB104K25
C 223	CKSRYB102K50
C 224	CKSRYB104K25
C 225	CKSRYB105K6R3
C 226	CCSRCH510J50
C 301	CEV101M10
C 302	CKSRYB224K16
C 303	CKSRYB224K16
C 304	10µF/10V CCH1349
C 305	CKSRYB224K16
C 306	10µF/10V CCH1349
C 307	CKSRYB224K16
C 309	CKSYB475K16
C 501	CKSRYB102K50
C 502	CKSRYB104K25
C 503	CKSRYB104K25
C 505	CKSRYB104K25
C 506	CKSRYB104K25
C 508	CKSRYB104K25
C 509	CKSRYB104K25
C 601	CEV220M6R3
C 602	CEV220M6R3
C 701	CKSRYB104K25
C 702	CKSRYB104K25
C 703	CKSRYB103K25
C 704	CKSRYB103K25
C 705	CKSRYB104K25
C 706	CKSRYB104K25
C 707	CKSRYB103K25
C 708	CKSRYB473K25

E

Unit Number:
Unit Name:PCB Unit(Load)

Q 21	Photo-transistor	CPT231SCTU
Q 22	Photo-transistor	CPT231SCTU
L 21	Inductor	LCYBR15J1608
L 22	Inductor	LCYBR15J1608
S 21	Spring Switch(LOAD1)	CSN1051

Circuit Symbol and No.		Part No.
S 22	Spring Switch(LOAD2)	CSN1052

D

Unit Number:CWX2614
Unit Name:PCB Unit(LED)

D 31	Chip LED	CL205IRXTU
D 32	Chip LED	CL205IRXTU
S 31	Spring Switch(CAMLOAD)	CSN1052
S 32	Spring Switch(CAMEOK)	CSN1052
R 31		RS1/16S0R0J

G

Unit Number:CWX2611
Unit Name:PCB Unit

L 1	Inductor	CTF1389
S 41	Spring Switch(LOAD3)	CSN1051

F

Unit Number:CWX2613
Unit Name:PCB Unit(Side)

MISCELLANEOUS

S 11	Spring Switch(CAMCLMP)	CSN1052
VR11	Semi-fixed 1kΩ(B)	CCP1338

RESISTORS

R 11		RS1/16S562J
R 12		RS1/16S562J
R 13		RS1/10S391J
R 14		RS1/10S391J
R 15		RS1/16S0R0J
R 16		RS1/16S0R0J

CAPACITORS

C 12		CKSRYB104K25

H

Unit Number:
Unit Name:PCB Unit(M2 Unit)

MISCELLANEOUS

IC 1	IC	BA6849FS
S 7	Switch(HOME)	CSN1057
S 8	Switch(CLAMP)	CSN1057

RESISTORS

R 1		RS1/16S221J
R 2		RS1/16S221J
R 3		RS1/16S4R7J
R 4		RS1/16S1R0J

CAPACITORS

C 1		CKSRYB104K16

Circuit Symbol and No.		Part No.

Miscellaneous Parts List

M 1	Motor Unit(-A)(CAMGEAR)	CXC1144
M 2	Motor Unit(-B)(ELEVATION)	CXC1145
M 3	Motor Unit(-A)(CRG)	CXC1143
VR1	Variable Resistor 10kΩ	CCW1023
	PU Unit(Service)(PX1)	CXX1568
	Fan Motor	CXM1268

6. ADJUSTMENT

6.1 CD ADJUSTMENT

1) Precautions on Adjustment

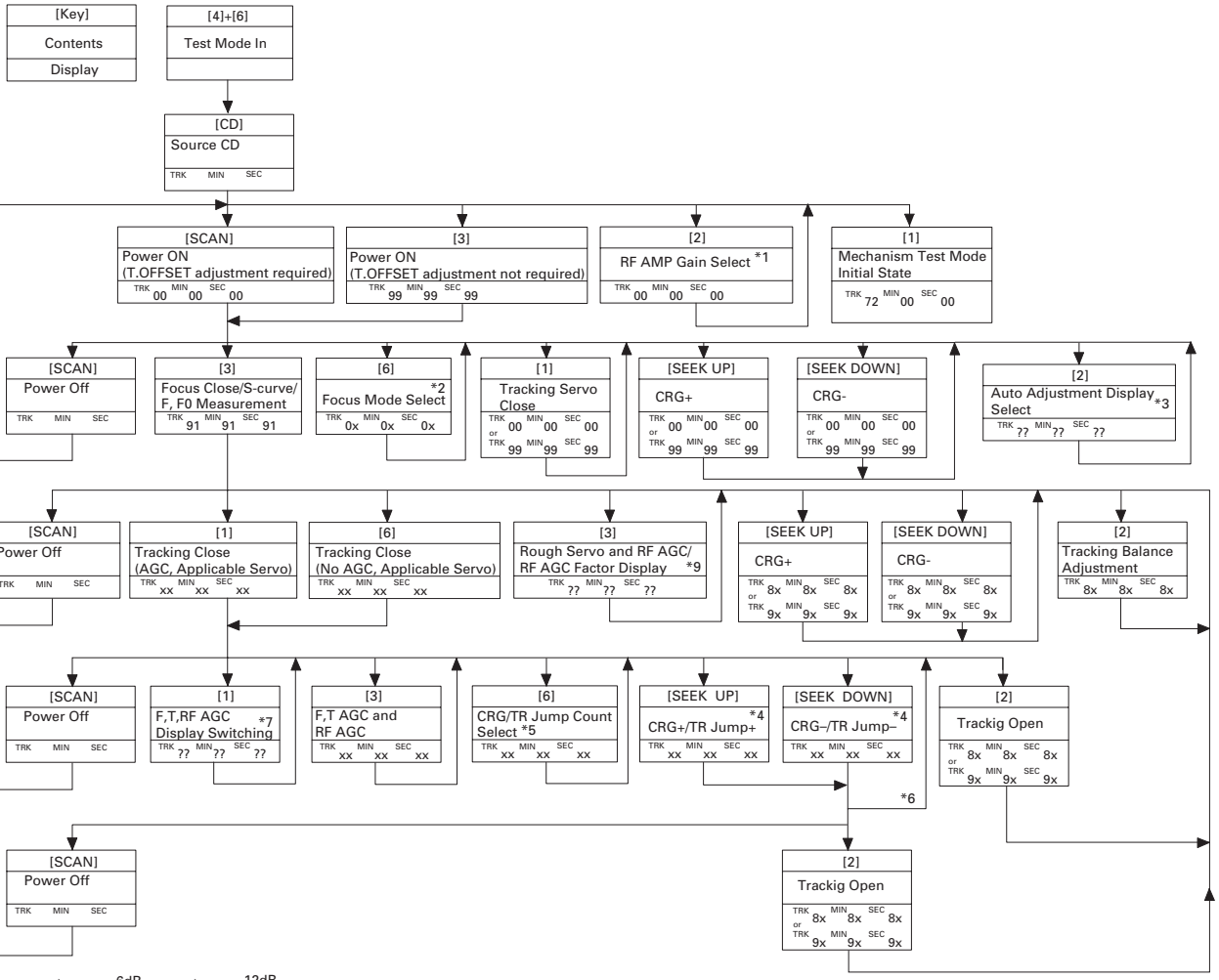
- The unit employs a single voltage (+5V) for the regulator, thus the reference potential of the signal is REFO (approximately 2.5V) rather than GND.
  Inadvertent contact of REFO and GND during adjustment can result not only in disabling normal potential measurement but also in exposing the pickup to strong impacts due to malfunctioning of the servo. Therefore, you are requested to observe the following precautions.
- Make sure that the negative probe of the measuring instrument is not connected to REFO or GND. Special care must be exercised so that the channel 1 negative probe may not be connected to the oscilloscope and the channel 2 negative probe to GND. Since the frame of the measuring instrument is usually at the same potential as the negative probe, the frame of the measuring instrument must be changed to floating status.
  When REFO is inadvertently connected to GND, you must immediately turn off the regulator or power supply.
- The regulator must be turned off before mounting or dismounting filters or wiring materials.
- You should not start adjustment or measurement immediately after the regulator is turned on. It is recommended to run the player for approximately one minute so that it may stabilize.
- When the test mode is turned on, various protective functions from the software become unavailable. Thus, you must make sure that undesirable electric or mechanical shocks are not be given to the system.
- This model employs a photo-transistor for detecting discs at their loading or ejection. Thus, if its outer case is removed during repair work and internal parts are exposed to light of strong intensity, malfunctions including the following can result:
  * The eject button becomes inoperable during play. Pressing the eject button does not eject a disc and play is continued.
  * Loading becomes unavailable.

  If a malfunction is recognized, appropriate remedial actions must be taken. Such actions include changing the light source position, changing the unit position and applying a cover to the photo-transistor.
- When you press the EJECT key to eject a disc, you must not touch any other key until the ejection is complete.
- If you press the UP or DOWN for the focus search in the test mode, you must turn the power off immediately. (Otherwise, the lens will be forced to stick to the top or bottom, potentially resulting in the burning of the actuator.)

2) Description of the Test Mode

- Turning on the Test Mode
  See page 56.
- Ending the Test Mode
  Apply the reset (the reset will be applied two minutes after the power is turned from off).
- Operation of TR JUMPs (except 100TR) continues after your finger has left the key. CRG, MOVE and 100TR JUMP are forced to the tracking close mode as soon as the key is released.
- Turning the power on or off resets the JUMP MODE to the Single TR.

● Flow Chart



*1) TYP → -6dB → -12dB

*2) Focus Close → S.Curve Check → LD Off
(F.Cancel value
= (Upper 8 bits of the setting (7F[H] to 80[H] + 128)/4
= 63[D] to 32[D] to 00[D]).

*3) F.Offset Display →RF Offset Display→ T.Bal Display → Rough Servo.

*4) Single TR /4TR / 10TR / 32TR / 100TR

*5) Single TR → 4 TR → 10 TR → 32 TR → 100 TR → CRG Move
9X(8X):91(81) 92(82) 93(83) 94(84) 95(85) 96(86)

*6) Only for the CRG Move and 100TR modes

*7) Track No. / Min / Sec → F.AGC Gain →T.AGC Gain →RF AGC Gain
(F.T. AGC Gain = (Current value/Initial value) x 20)

*8) CRG motor voltage : 2 [V]

[Key]	Operation
	Test Mode
[SCAN]	Power ON/OFF
[SEEK UP]	CRG+/TR Jump+ (Toward outer perimeter)
[SEEK DOWN]	CRG-/TR Jump- (Toward inner perimeter)
[1]	Tracking close and AGC and Applicable servo / AGC , AGC display switching
[2]	RF gain select / Offset adjustment display/ Tracking balance adjustment / Tracking open
[3]	Focus Close, S.Curve / Rough Servo/ RF AGC / F,T, RF AGC
[6]	Focus mode select / Tracking close / CRG·TR jump select
[4]	Focus open
[5]	Jump off
[DISC UP]	DISC UP
[DISC DOWN]	DISC DOWN

*9)The first press displays the RF AGC coefficient. The second one or after performs the rough servo and RF AGC adjustments, and then displays the RF AGC coefficient.

- In all TR Jump modes except for 100TR, track jump operation continues even after the key is released.
  In the CRG Move and 100TR Jump modes, the tracking servo loop closes at the same time when the key is released.
- When the power is turned off and on, the jump mode, the RF AMP gain
  setting, and the auto adjustment values are reset to the Single TR (91),0dB, and the factory setting respectively.

Note: When you pressed the [SEEK UP] or [SEEK DOWN] key during the Focus Search, you must turn the power off immediately (otherwise, the lens can stick resulting in actuator damages).

6.2 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

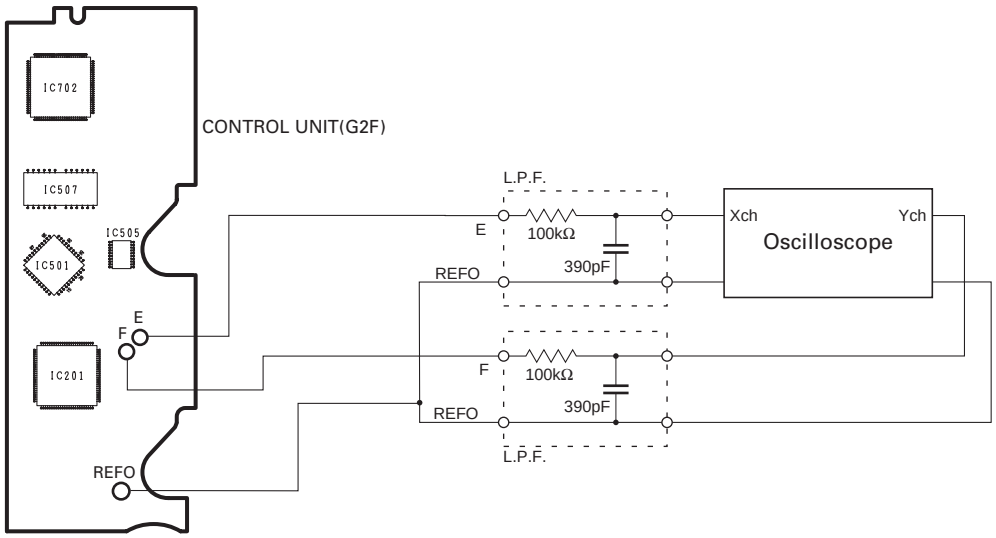
• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

• **Method :**

• Measuring Equipment	• Oscilloscope, Two L.P.F.
• Measuring Points	• E, F, REFO
• Disc	• TCD-784
• Mode	• TEST MODE



• **Checking Procedure**

1. In test mode, load the disc and switch the 5V regulator on.
2. Using the **SEEK UP** and **SEEK DOWN** buttons, move the PU unit to the innermost track.
3. Press key **3** to close focus, the display should read "91". Press key **2** to implement the tracking balance adjustment the display should now read "81". Press key **3** 4 times. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

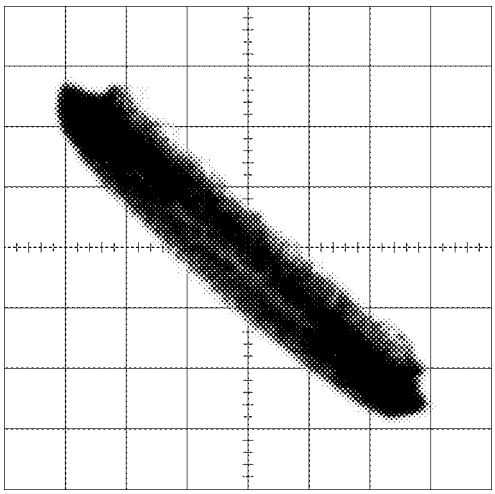
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

• **Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

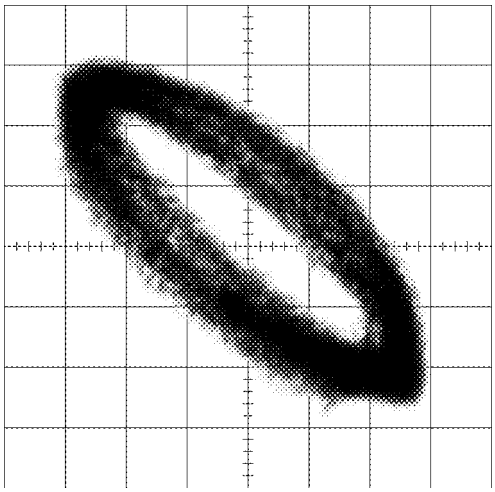
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

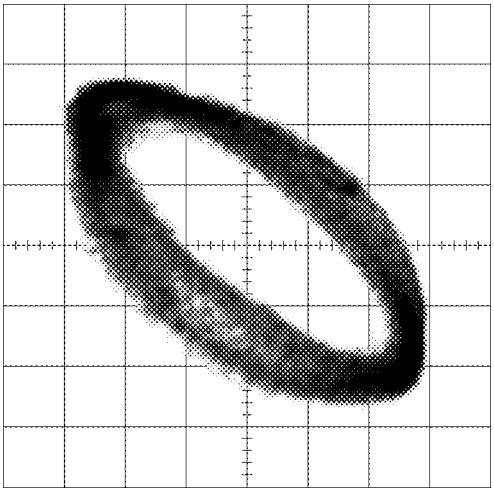
0°



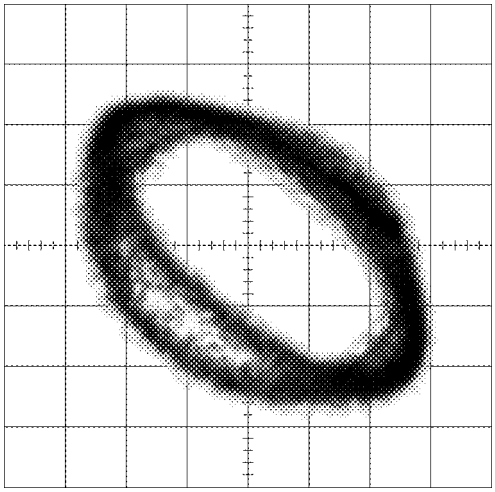
30°



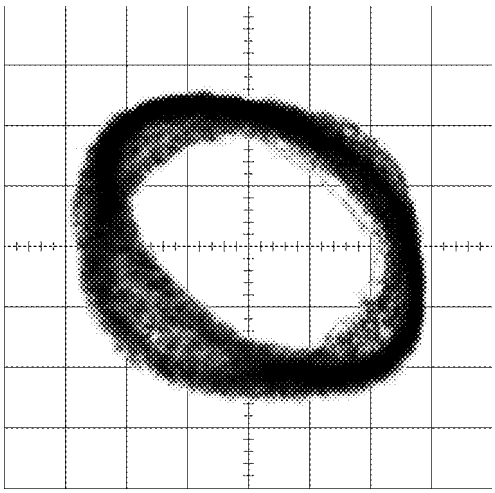
45°



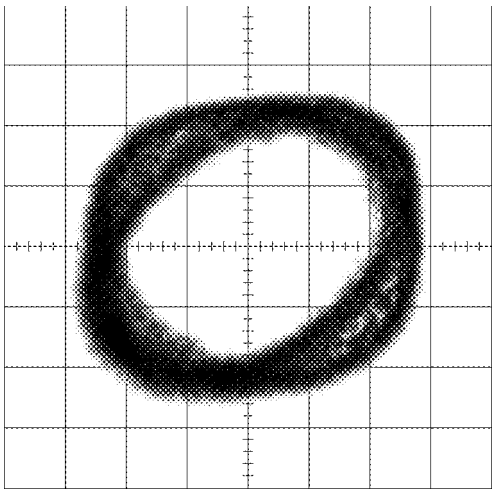
60°



75°

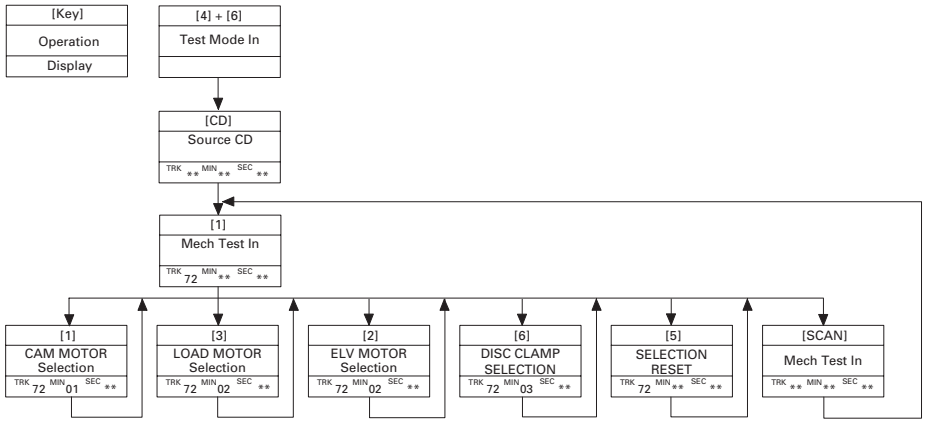


90°



6.3 TEST MODE(CD)

CD Mech. Test Mode

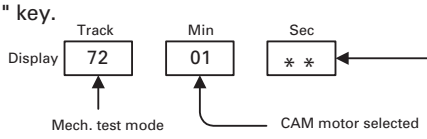


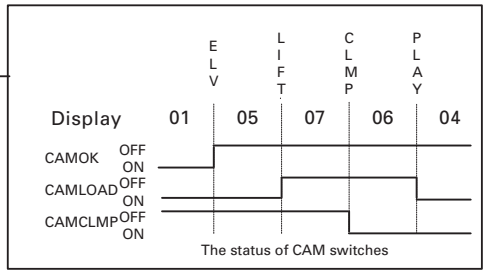
Note:
The mechanical operations such as loading, ejection and disc change are controlled by the highly sophisticated method.
Before entering this test mode, fully grasp how the mechanism is controlled, by referring to the mechanism operation flowchart.

[Key operations]
Select the motor to be operated by using one of the following three keys: 1, 2,3, and 6.
To move the selected motor, use the "SEEK UP / SEEK DOWN" key.
While the key is being pressed, the motor will continue to move.

1) To select the CAM motor, press the "1" key.

"SEEK UP" key: to move in the CAM PLAY direction
"SEEK DOWN" key: to move in the CAM ELV direction

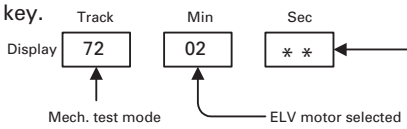


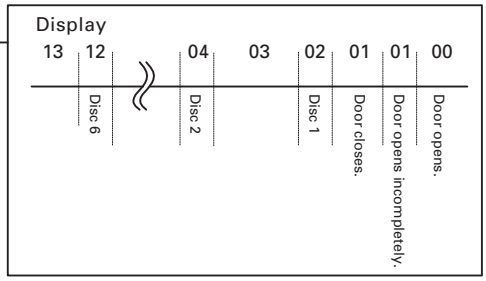


Notes:
To protect the mechanism from unexpected damages, keep the following points in mind:
1. Before moving the CAM motor from the ELV position to the LIFT position, be sure to move the ELV motor to select the disc 1 to 6.
2. Before moving the CAM motor from the CLMP position to the LIFT position, be sure to select the SPDL claws to release the disc clamp.

2) To select the ELV motor, press the "2" key.

"SEEK UP" key: to move in the ELV UP direction
"SEEK DOWN" key: to move in the ELV DOWN direction

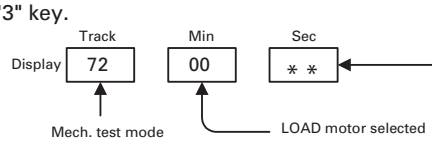


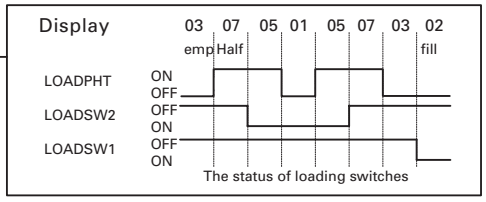


Note:
Before moving the ELV motor, be sure to move the CAM motor to the ELV position or LIFT position first. If not, the mechanism may be damaged.
When the CAM motor is set to the ELV position, do not move the ELV motor from the door open position to the door closed position.

3) To select the LOAD motor, press the "3" key.

"SEEK UP" key: to load a disc.
"SEEK DOWN" key: to eject the loaded disc.





● Electrical and servo errors

Mode	Digit	Code	Name	Descriptions	AVC-LAN error code
Electrical error	1,2	A0	VD power NG	VD power abnormal	ERROR 4
	1,2	A1	Mech Vref NG	Mech elevation reference voltage abnormal	ERROR 4
	3,4			At the occurrence of error, motor control output (*6)	
Servo error	1,2	10	Carriage home NG	The CRG cannot move to inner tracks or move from inner tracks.	ERROR 3
	1,2	11	Focus search NG	No focus	ERROR 1
	1,2	12	Spindle Lock NG Subcode	No spindle lock. Sub codes cannot be read.	ERROR 1
	1,2	14	Mirror NG	Not applicable to the G2 mech.	
	1,2	17	Setup NG	AGC protection does not function. Focus is easily unlocked.	ERROR 1
	1,2	19	Tracking Balance NG	Not applicable	
	1,2	30	Search time-out	Cannot reach the target address.	ERROR 1
	3			At the occurrence of error, claw switch value	
	4			The rotation rate does not satisfy the spec.	

● Mechanical errors

Mode	Digit	Code	Name	Descriptions	AVC-LAN error code
Waiting for disc pulled out	1,2	20		CAMRST→Forced ejection→Waiting for disc pulled out	ERROR 3
	1,2	21		WTLOAD→Forced ejection→Waiting for disc pulled out	ERROR 3
	1,2	22		EJCTON→Forced ejection→Waiting for disc pulled out	ERROR 3
	1,2	23		SEJPCK→Forced ejection→Waiting for disc pulled out	ERROR 3
	1,2	24		HLFLOAD→Forced ejection→Waiting for disc pulled out	ERROR 3
	1,2	25		DINSRDY→Forced ejection→Waiting for disc pulled out	ERROR 3
	1,2	26		LIFTDN→LIFTUP→Forced ejection→Waiting for disc pulled out	ERROR 3
	3			The m2stat value at the original error followed by forced ejection (*3)	
	4			The LOAD SW value (3 bits) at the forced ejection end:	
CAM Err	1,2	51	MFWDTO	CAM motor FWD time-out error during TRAY UP operation	ERROR 3
	1,2	52	MREVTO	CAM motor REV time-out error during TRAY UP operation	ERROR 3
	1,2	5a	MFWDTO	CAM motor FWD time-out error during TRAY DN operation	ERROR 3
	1,2	5b	MREVTO	CAM motor REV time-out error during TRAY DN operation	ERROR 3
	1,2	5e	MFWD2TO	CAM motor FWD2 time-out error during TRAY DN operation	ERROR 3
	1,2	61	MFWDTO	CAM motor FWD time-out error during CRG OUT operation	ERROR 3
	1,2	62	MREVTO	CAM motor REV time-out error during CRG OUT operation	ERROR 3
	1,2	64	MLSWNG	LOAD SW ON stuck error during CRG OUT operation	ERROR 3
	1,2	66	MREV2TO	CAM motor REV2 time-out error during CRG OUT operation	ERROR 3
	1,2	6a	MFWDTO	CAM motor FWD time-out error during CRG IN operation	ERROR 3
	1,2	6b	MREVTO	CAM motor REV time-out error during CRG IN operation	ERROR 3
	1,2	71	MFWDTO	CAM motor FWD time-out error during ELV IN operation	ERROR 3
	1,2	72	MREVTO	CAM motor REV time-out error during ELV IN operation	ERROR 3
	1,2	7a	MFWDTO	CAM motor FWD time-out error during ELV OUT operation	ERROR 3
	1,2	7b	MREVTO	CAM motor REV time-out error during ELV OUT operation	ERROR 3
	1,2	7d	MLSWNG	LOAD SW ON stuck error during ELV OUT operation	ERROR 3
	1,2	7f	MREV2TO	CAM motor REV2 time-out error during ELV OUT operation	ERROR 3
	1,2	81	MFWDTO	CAM motor FWD time-out error during EIN_EXP operation	ERROR 3
	1,2	82	MREVTO	CAM motor REV time-out error during EIN_EXP operation	ERROR 3
	1,2	8a	MFWDTO	CAM motor FWD time-out error during CIN_EXP operation	ERROR 3
	1,2	8b	MREVTO	CAM motor REV time-out error during CIN_EXP operation	ERROR 3
	1,2	aa	MOVERCNT	CAM SW has not been determined during CAM operation (Chatter remains.)	ERROR 3
	3			The OK stop position at the last elevation operation (*4)	
	4			The CAM SW value (3 bits) before retry (with the first error)	
CAMRST Err	1,2	91	MFWDTO	ELV motor FWD time-out error during CAMRST operation	ERROR 3
	1,2	92	MREVTO	ELV motor REV time-out error during CAMRST operation	ERROR 3
	1,2	93	MOVERCNT	Over-count error during CAMRST operation	ERROR 3
	1,2	94	MSPDERR	The claws do not close during CAMRST operation.	ERROR 3

Mode	Digit	Code	Name	Descriptions	AVC-LAN error code
	1,2	96	MREV2TO	Overrun error during CAMRST operation	ERROR 3
	3			The CAM SW value (3 bits) before operation	
	4			The ELV stop position before operation (*5)	
Claw Err	1,2	9a	MSPDERR	The claws do not close during DSKFREE operation.	ERROR 3
	1,2	9b	MSPDERR	The claws do not open during DSKLOCK operation.	ERROR 3
	1,2	9c	MSPDERR	The claws do not close during CLWCLSE operation.	ERROR 3
	1,2	9d	MSPDERR	The claws do not open during CLWOPEN operation.	ERROR 3
	3			The CAM SW value (3 bits) with the claw error	
	4			The CLAW SW values before and after the error stop (2 bits each)	
DISCSEL Err	1,2	b1	MFWDTO	ELV motor FWD time-out error during DISCSEL operation	ERROR 3
	1,2	b2	MREVTO	ELV motor REV time-out error during DISCSEL operation	ERROR 3
	1,2	b3	MODERCNT	Over-count error during DISCSEL operation	ERROR 3
	1,2	b6	MREV2TO	Overrun error during DISCSEL DISC operation	ERROR 3
	3			The target disc No.	
	4			The ELV error stop position before retry (*5)	
LIFT Err (*2)	1,2	c1	MFWDTO	ELV motor FWD time-out error during LIFT UP operation	ERROR 3
	1,2	c2	MREVTO	ELV motor REV time-out error during LIFT UP operation	ERROR 3
	1,2	c3	MODERCNT	Over-count error during LIFT UP operation	ERROR 3
	1,2	c6	MREV2TO	Overrun error during LIFT UP operation	ERROR 3
	1,2	d1	MFWDTO	ELV motor FWD time-out error during LIFT DN operation	ERROR 3
	1,2	d2	MREVTO	ELV motor REV time-out error during LIFT DN operation	ERROR 3
	1,2	d3	MOVERCNT	Over-count error during LIFT DN operation	ERROR 3
	1,2	d4	MLSWNG	DISC IN (SIDE SW ON) is sensed during door close operation.	ERROR 3
	1,2	d6	MREV2TO	Overrun error during LIFT DN operation	ERROR 3
	1,2	d7	MLSW2NG	"Pinched disc" is sensed during LIFT DN operation (within the range of +/-1LSB, 200ms continued)	ERROR 3
	3			Current disc No.	
	4			The ELV error stop position before retry (*5)	
error ERROR 3	1,2	90	BACKUP_NG	CAMRST→Forced ejection→Door open/close error	ERROR 3
	1,2	eb	MLSWNG	LOAD SW error during HLFLOAD operation	ERROR 3
	1,2	ed	MLSWNG	LOAD SW error during SEJPCK operation	ERROR 3
	1,2	fb	MLSWNG	LOAD SW error during DINSRDY operation	ERROR 3
	1,2	e0	BACKUP_NG	Backup NG during EJCTON operation	ERROR 3
	1,2	e2	MREVTO	MREVTO error during EJCTON operation	ERROR 3
	1,2	e6	MREV2TO	MREV2TO error during EJCTON operation	ERROR 3
	1,2	f0	BACKUP_NG	Backup NG during WTLOAD operation	ERROR 3
	1,2	f1	MFWDTO	MFWDTO time-out error during WTLOAD operation	ERROR 3
	1,2	f2	MREVTO	SIDE SW ON with OK SW ON waiting retry during WTLOAD operation	ERROR 3
	1,2	f3	MCHTERR	Incomplete insertion error during WTLOAD operation	ERROR 3
	1,2	f4	MLSWNG	OK SW ON but PHOTO ON during WTLOAD operation	ERROR 3
	1,2	f5	MFWD2TO	MFWD2TO time-out error during WTLOAD operation	ERROR 3
	1,2	f6	MREV2TO	OK SW ON waiting retry (3 times) during WTLOAD operation	ERROR 3
	1,2	f7	MLSW2NG	SIDE SW ON at the OK SW ON waiting mode during WTLOAD operation	ERROR 3
	1,2	ab	MOVERCNT	The LOAD SW has not been determined during insertion/loading operation (Chatter remains.)	ERROR 3
	3			The LOAD SW value (3 bits) at the FEJCHK end	
	4			The ELV stop position at the FEJCHK end (*5)	
New test mode	1,2	40	New test mode	Focus NG after servo close	ERROR 1
	1,2	41	New test mode	Lock NG after servo close	ERROR 1
	1,2	42	New test mode	Sub code NG after servo close	ERROR 1
	1,2	43	New test mode	Not applicable to the G2 mechanism.	ERROR 1
	3			The claw SW value at the occurrence of error	
	4			The rotation rate does not satisfy the spec.	

Notes:
*1) Insertion/ejection error is output only when door open/close error occurs with forced eject.

*2) LIFT error is output under the following conditions:
LIFTDN --> TLFTUP --> forced eject --> door open/close error

*3) The values of m2stat:
B.upNg=0, FwdTo=1, RevTo=2, Chata=3, OverCnt=4, SwNg=5, SpdNg=6,
Fwd2To=7, Rev2To=8, Sw2Ng=9

*4) The last results of chatter check (compared with the target center):
+8LSB=1, +7LSB=2, +6LSB=3, +5LSB=4, +4LSB=5, +3LSB=6, +2LSB=7,
+1/0LSB=8, -1/0LSB=8,-2LSB=9, -3LSB=a, -4LSB=b, -5LSB=c, -6LSB=d, -7LSB=e, -8LSB=f,
the others=0

*5) Basically the value of eudpzt except for the following case:
In case of eudpzt=1 and door close mode, eudpzt=e

*6) bit0: P_lo1, bit1: P_lo2, bit2: P_elv1, bit3: P_elv2, bit4: P_cg1, bit5: P_cg2,
bit6: P_elv_vol, bit7: P_lod_vol

7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 DISASSEMBLY

● **Removing the Grille Assy (Fig.1)**

1 Remove the four screws and then remove the Grille Assy.

Fig.1

● **Removing the Holder Unit (Fig.2)**

1 Remove the four screws and then remove the Holder Unit.

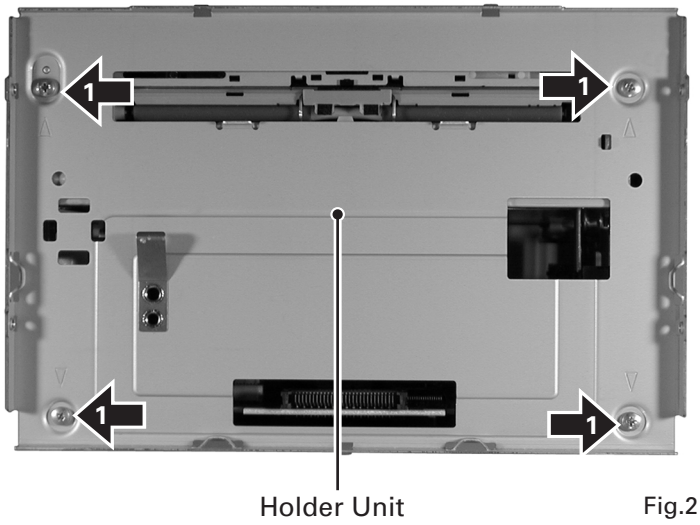


Fig.2

● Removing the Chassis Unit (Fig.3)

1 Remove the four screws and then remove the Chassis Unit.

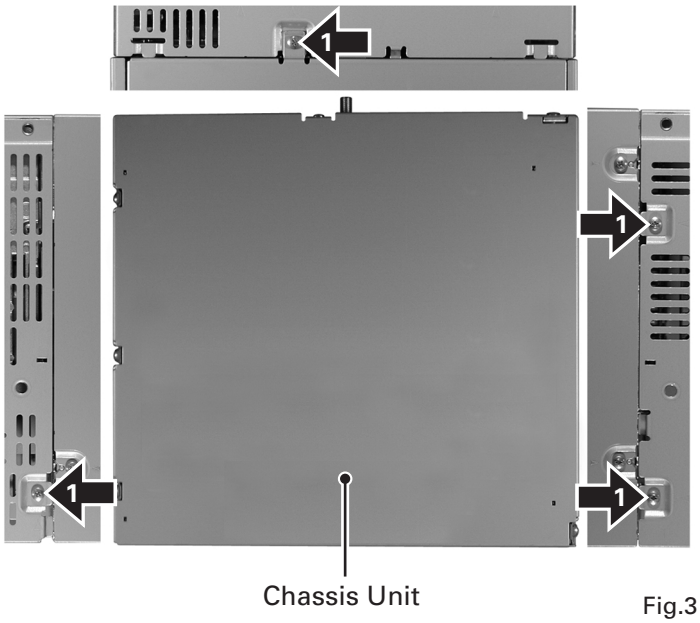


Fig.3

● Removing the Tuner Amp Unit (Fig.4)

1 Remove the two screws.

2 Remove the three screws.

3 Straighten the tabs at two locations indicated.

4 Remove the three screws and then remove the Tuner Amp Unit.

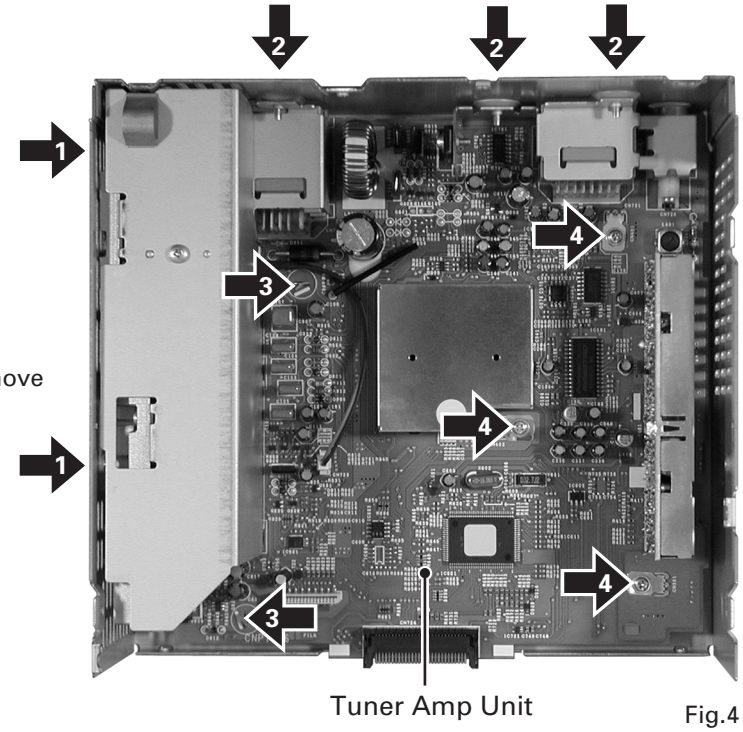


Fig.4

● **Removing the Case(Fig.5)**

1. Remove the eight screws A and then remove the Case.

● **Removing the Control Unit(G2F) (Fig.5)**

1. Apply shorting solder to the PU flexible cable before disconnecting it from the connector.
2. Disconnect the two connectors.
3. Remove the two screws B.
4. Remove the Control Unit(G2F).

● **Removing the Service Mechanism Unit(G2B) (Fig.5)**

1. Remove the two springs A and two springs B.
2. Remove the two screws C and then remove the Bracket.
3. Remove the four Dampers and then remove the Service Mechanism Unit(G2B).

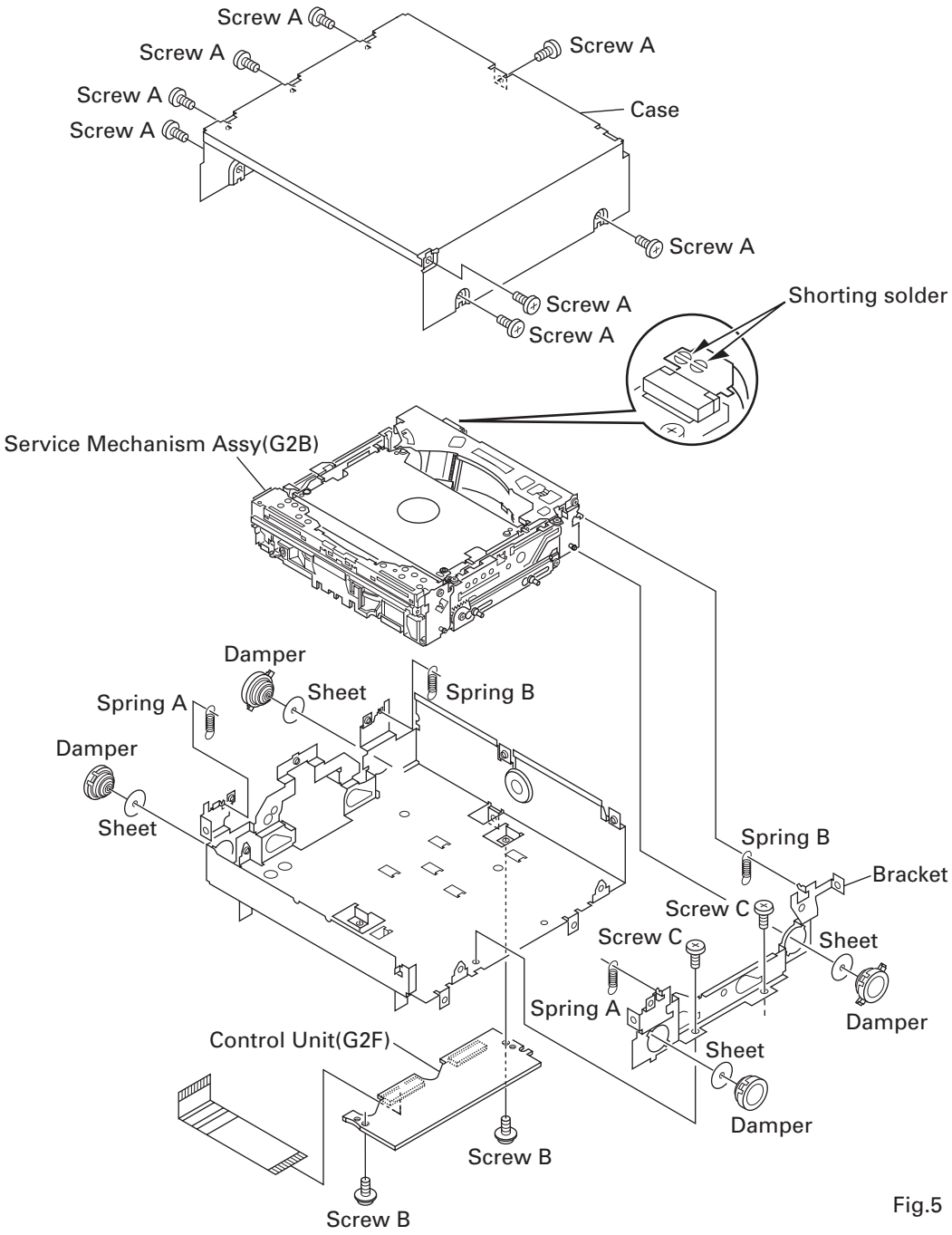


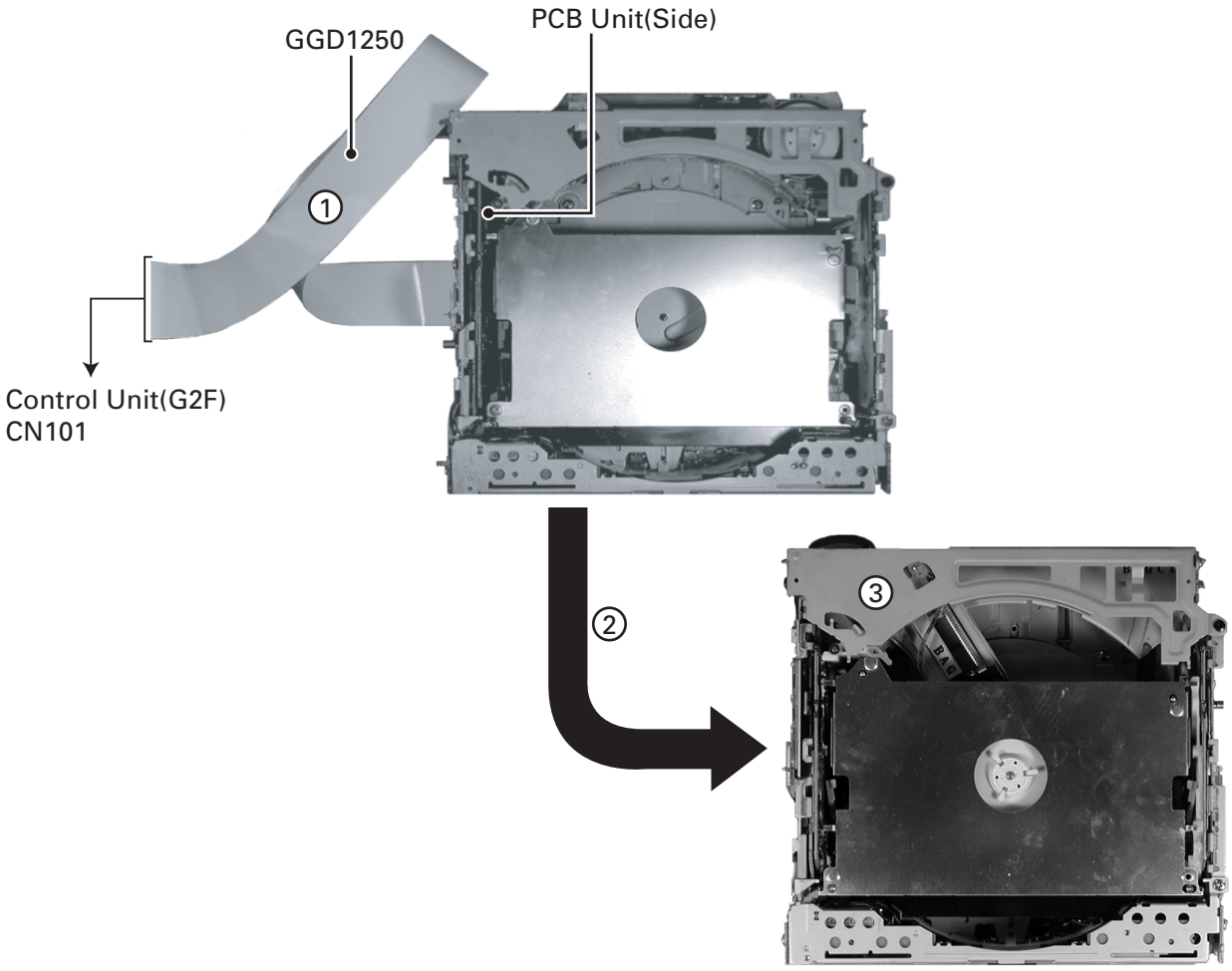
Fig.5

● Cautions on replacing the CD mechanism unit

The CD mechanism units available as service parts have been set in the shipment mode at the factory. Before mounting it on the product to be serviced, be sure to apply the power to a CD mechanism to put it into the initial mode, where the carriage mech assy stays at the disc clamp position, in accordance with the following method:

<Initial mode setting method>

1. Keep a CD mechanism unit out of the product to be serviced as shown below. Connect the 50-pin connector of the Control Unit (G2F) in the product the 50-pin connector of the PCB unit (Side) in the CD and mechanism by using the extension cable (GGD1250).
2. Apply the power (+14V) to the product to move the CD mechanism until it enters the initial mode and stops. (Operating time: about 30 seconds)
3. When it is confirmed that the CD mechanism stops in the initial mode, the setting completes.



● Removing the PU Unit(PX1)

1. Set the mechanism to the shipment mode.
2. Remove the two screws A and two screws B.
3. Remove the Frame.

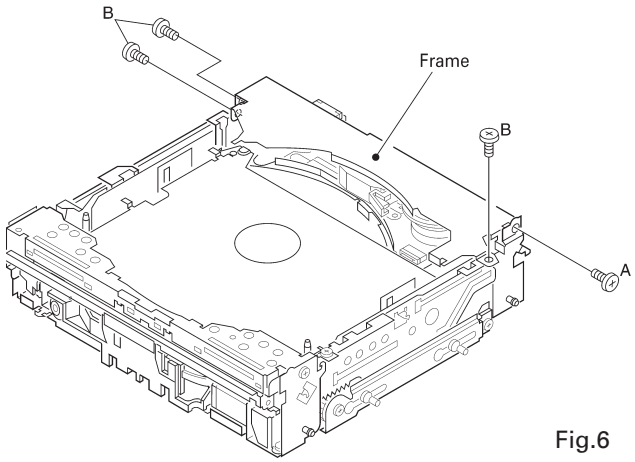


Fig.6

4. Apply shorting solder to the PU flexible cable before disconnecting it from the connector CN12.
5. Disconnect the flexible cable from the connector CN12, and remove the flexible cable Holder.
6. Remove the washer and Arm. (Be careful not to lose the spring B.)
7. Remove the screw, spring A, and Collar.
8. Remove the Carriage Mech. Assy.

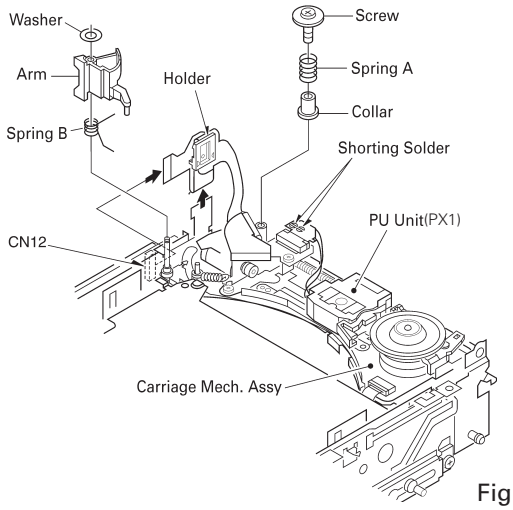


Fig.7

9. Apply shorting solder to the PU flexible cable before disconnecting it from the Connector.
10. Disconnect the PU flexible cable from the Connector
11. Move the PU Unit(PX1) to the left side slightly by turning the Gear.
12. Pull out the spindle motor Support Wheel Unit upwards to remove it.
13. Remove the Spring.
14. Slide the holder to make it easier to remove the Screw Unit.

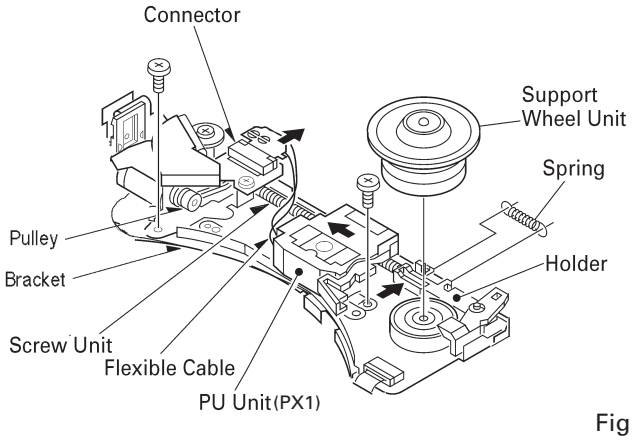


Fig.8

15. While pressing the shaft holder in the direction shown by the black arrow in the right figure, remove the PU Unit(PX1) together with the Screw Unit.

Note:
To assemble the PU Unit(PX1), insert the Spring on the PU rear between the PU Unit(PX1) and the Guide first.

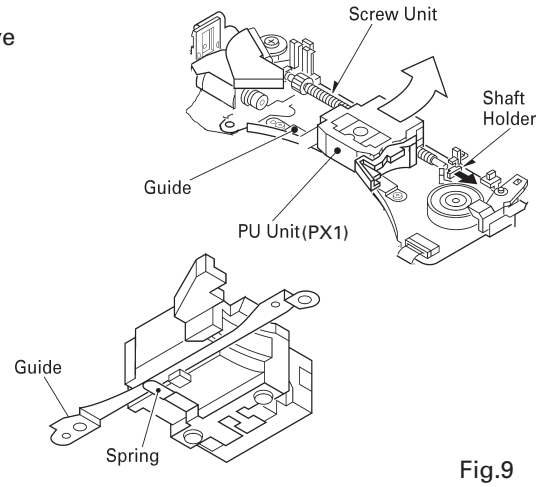
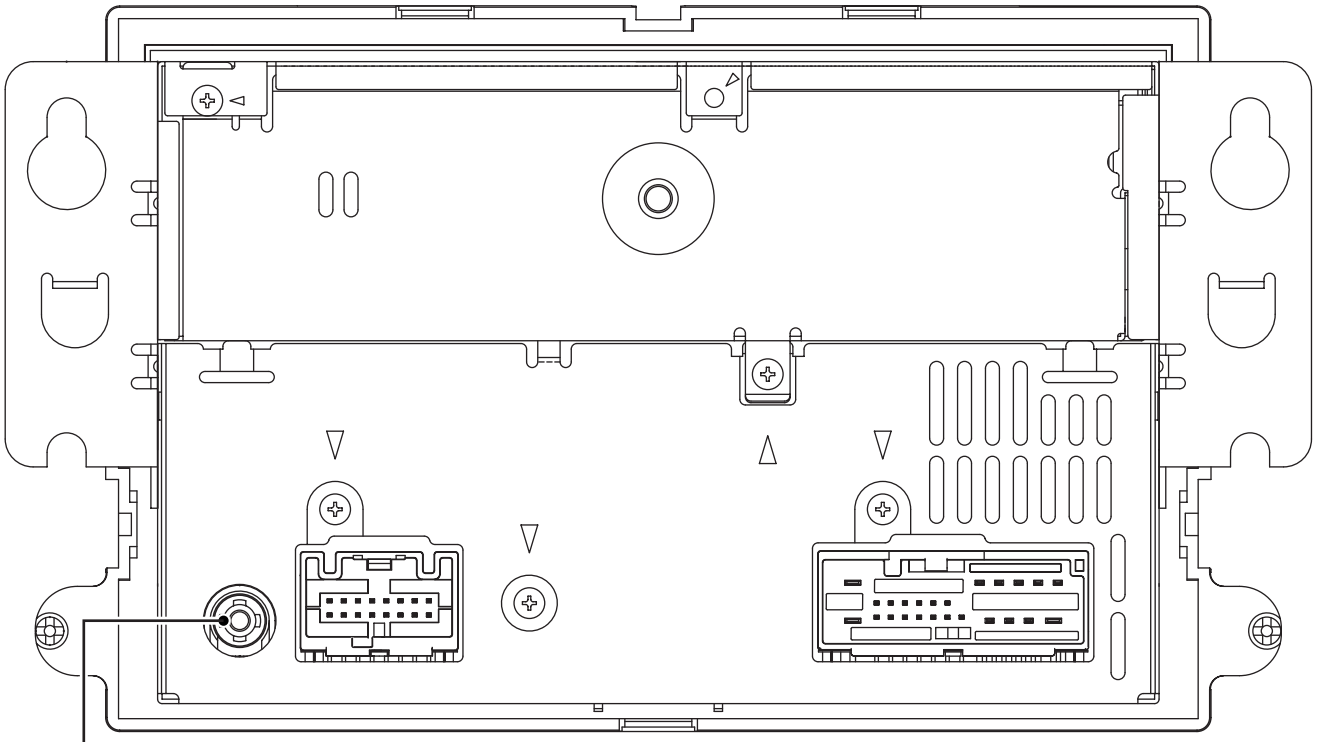
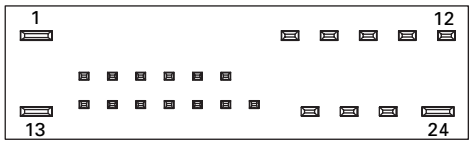


Fig.9

7.1.2 CONNECTOR FUNCTION DESCRIPTION





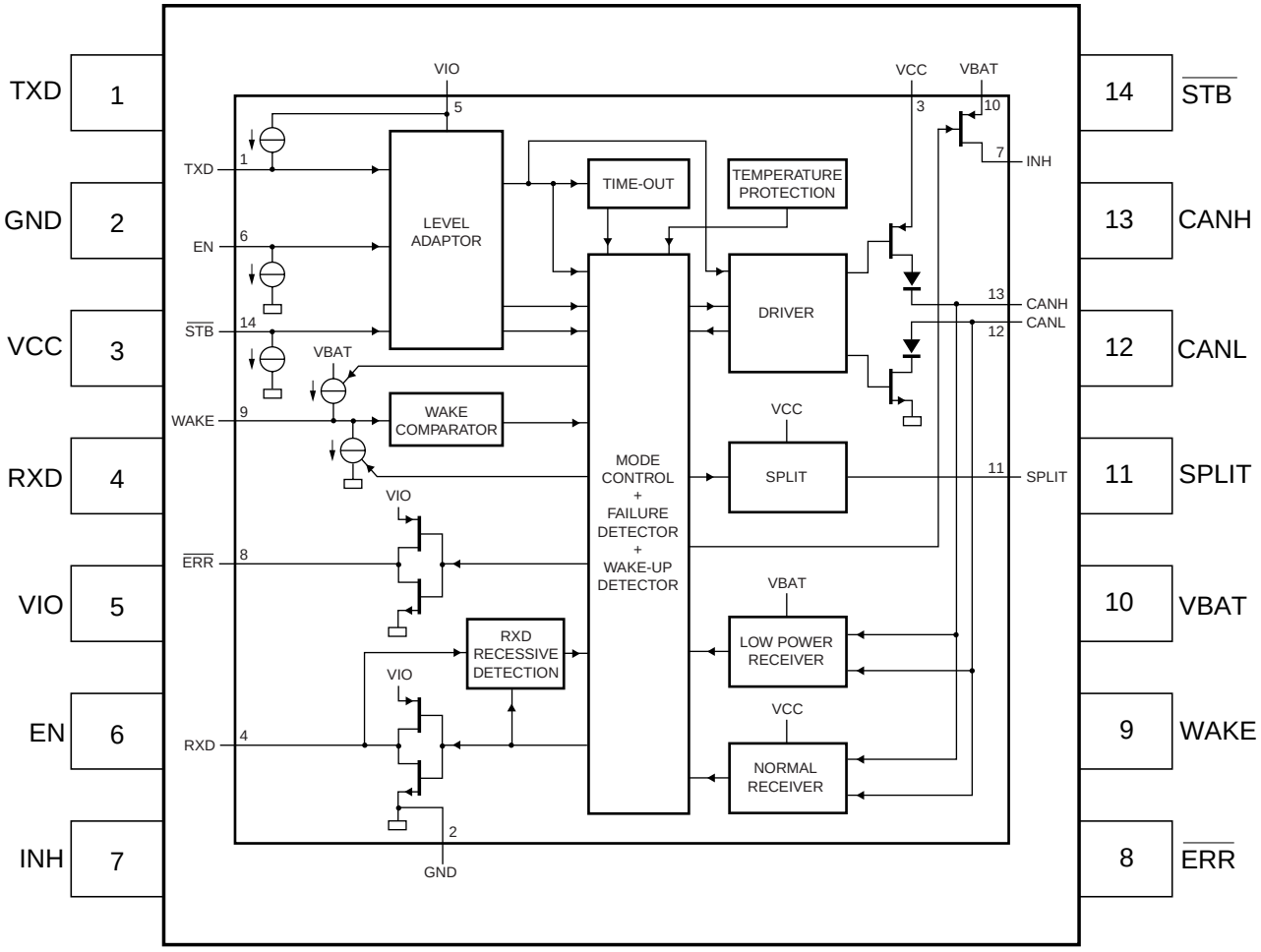
J3 CONNECTOR	
1	CDDJ L+
2	CDDJ L-
3	(CDDJ SHIELD)
4	MONO+
5	MONO-
6	(ASYSON)
7	NC
8	NC
9	CDDJ R+
10	CDDJ R-
11	(CDDJ GND)
12	(CDDJ BATT)
13	(MONO SHIELD)
14	NC
15	MS CAN A
16	MS CAN B

J1 CONNECTOR	
1	B. UP
2	RUN/ACC
3	ILL+
4	ILL-
5	(EHAM)
6	NC
7	PTA
8	FL+
9	RL+
10	RR+
11	FR+
12	FR-
13	POW GND
14	SPEED
15	START
16	NC
17	NC
18	SWC+
19	SWC-
20	RPA
21	FL-
22	RL-
23	RR-
24	NC

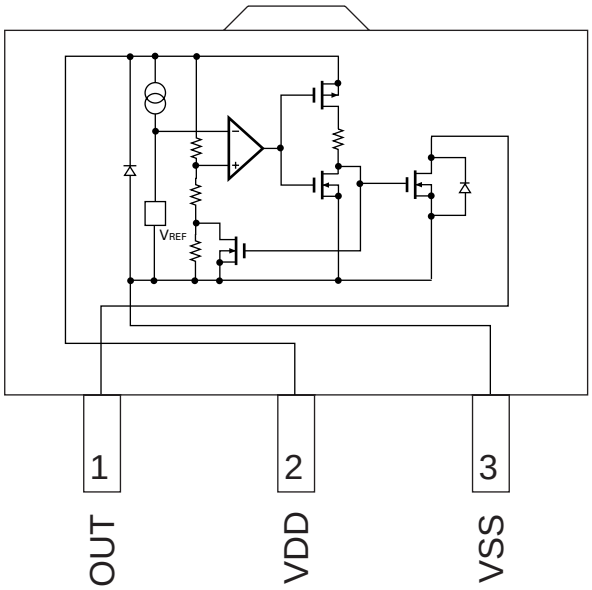
7.2 PARTS

7.2.1 IC

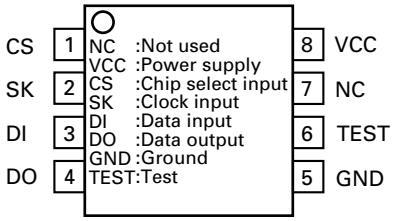
TJA1041T



* S-80843CNUA-B84



* PDH069C



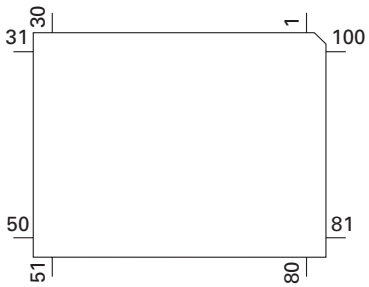
IC's marked by * are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

● Pin Functions(PD5872B)

Pin No.	Pin Name	I/O	Function and operation input/output
1	CTX	O	CAN communication output
2	CRX	I	CAN communication input
3	VFPWR	O	VF display : back light power
4	ILMOUT	O	ILM D/A output
5	VF_DT	O	VF display : data output
6	PWMIN	I	ILM PWM input
7	VF_CLK	O	VF display : clock output
8,9	NC		Not used
10	SCLKIN	I	Sub clock input
11	SCLKOUT	O	Sub clock output
12	$\overline{\text{RESET}}$	I	Reset input
13	XOUT		Crystal oscillating element connection pin
14	VSS1		GND
15	XIN		Crystal oscillating element connection pin
16	VCC1		VDD
17	NMI		Connect to VDD
18	RSPSW	O	Rear speaker switch output
19	$\overline{\text{ILMINT}}$	I	Ilumination interrupt input
20	$\overline{\text{ROTINT}}$	I	Rotary interruput input
21	$\overline{\text{ASENS}}$	I	Accessory sens input
22	BRXEN	I/O	P-BUS communication enebale input/output
23	$\overline{\text{BSRQ}}$	I	P-BUS request input
24	$\overline{\text{BRST}}$	O	P-BUS reset output
25	$\overline{\text{SPEED}}$	I	Speed paluse input
26	AMPMUTE	O	Amplifier mute output
27	$\overline{\text{BSENS}}$	I	Battery sens input
28	$\overline{\text{BSCK}}$	I	P-BUS clock input
29	BSI	I	P-BUS data input
30	BSO	O	P-BUS data output
31	PDO	O	Tuner PLL data output
32	PDI	I	Tuner PLL data input
33	$\overline{\text{PCK}}$	O	Tuner PLL clock output
34	FANPWR	O	Cooring FAN power output
35	IFDO	O	Unicorn/Maestro data output
36	SD	I	Tuner SD input
37	IFCLK	O	Unicorn/maestro:clock output
38	CDPWR	O	CD unit power output
39	ROMDATA	O	Diag EPROM : data/(CLKout) output
40	SYSPWR	O	System power controloutput
41	$\overline{\text{DSPRST}}$	O	Unicom : IC reset output
42	$\overline{\text{ERR}}$	I	Unicom : I/F error input
43	$\overline{\text{IFOK}}$	I	Unicom : I/F monitor port input
44	$\overline{\text{ACK}}$	I	Unicom : I/F ack input
45	$\overline{\text{IFCS}}$	O	Unicom : I/F chip select output
46	ROMCS2		Not used
47	ROMCS	O	Diag EPROM : CE output
48	ROMCK	O	Diag EPROM : CLK output
49	CANEN	O	CAN driver enable output
50-54	$\overline{\text{KDT}}$	I	Key data input
55	$\overline{\text{CANSTB}}$	I	CAN driver sleep mode input
56	TESTIN	I	Chip check test input
57	$\overline{\text{CANERR}}$	I	CAN driver error input
58-61	$\overline{\text{KST}}$	I	Key strove input
62	VCC2		VDD
63	$\overline{\text{KST}}$	I	Key strove input
64	VSS2		GND
65,66	ROTIN	I	Rotary pulse input
67	VFCE	I	VF display : CE input
68	$\overline{\text{BLK}}$	I	VF display : VF inhibit input
69	RMUTE	O	Rear mute output

Pin No.	Pin Name	I/O	Function and Operation
70	EVST		Not used
71	FMUTE	O	Front mute output
72	$\overline{\text{RPAIN}}$	I	Reverse parking aid input
73	$\overline{\text{ST}}$	I	Tuner stereo input
74	$\overline{\text{WAKEUP}}$	I	Wake up sens input
75	$\overline{\text{PTAIN}}$	I	PTA interrupt input
76	EHAMPWR	O	EHAM control output
77	$\overline{\text{PLLCE2}}$	O	Tuner : PLL chip eneble output 2
78	PLLCE	O	Tuner : PLL chip eneble output
79	LOCL	O	Tuner : Local low output
80-92	NC		Not used
93	CLIPIN	I	Clip detector Input
94	SWCIN	I	SWC input
95	ILMDCIN	I	Illumination DC input
96	AVSS		GND
97	SL	I	Tuner SL level input
98,99	NC		Not used
100	WKOUT	O	CAN driver local wakeup output

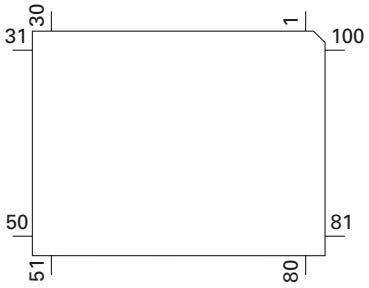
* PD5872B



● Pin Functions (LC75750EHS)

Pin No.	Pin Name	I/O	Function and Operation
1-3	G1-3	I	Grid signal
4	VFL	I	VF power supply
5-92	S88-S1	O	Segment output
93	VSS		GND
94	OSCO	O	System clock output
95	OSCI	I	System clock input
96	VDD		Power supply
97	BLK		Back light
98	CE	I	Data control input
99	CL	I	Clock input
100	DI	I	Data input

* LC75750EHS

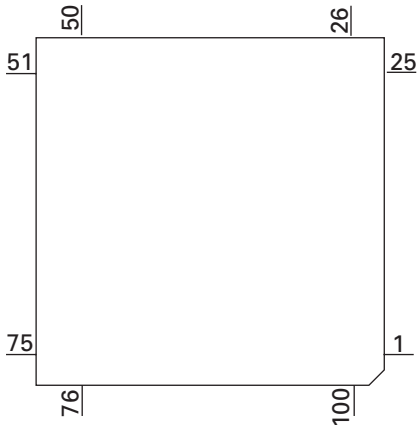


● Pin Functions (PD5890A)

Pin No.	Pin Name	I/O	Function and Operation
1	STSMO	O	STS test output
2	SPDLFG	I	Spindle FG pulse input
3	TXTSO	O	TEXT control parameter serial output
4	TXTSI	I	TEXT data serial input
5	TXTSCK	O	TEXT clock output
6	BYTE	I	VCC connected
7	CNVSS	I	VSS connected
8	POWER	O	CD : +5V control output
9	CONT	O	CD : Servo driver control output
10	$\overline{\text{RESET}}$	I	Reset input
11	XOUT	O	Crystal oscillating element connection pin
12	VSS1		GND
13	XIN	I	Crystal oscillating element connection pin
14	VCC		Back up 5V
15	$\overline{\text{NMI}}$	I	Pull up
16	NC		Not used
17	BRST	I	P–BUS reset input
18	TXTPACK	I	TEXT PACK interrupt input
19,20	NC	O	Not used
21	CAMOK	I	Cam operation sense 1 input
22	CAMLOAD	I	Cam operation sense 2 input
23	CAMCLMP	I	Cam operation sense 3 input
24	$\overline{\text{TESTIN}}$	I	Test program start input
25	LOCK	I	CD : LSI spindle lock sense input
26	TXTSTB	O	TEXT parameter output
27	BRXEN	I/O	P-BUS : Reception enable input/output
28	BSRQ	O	P-BUS : Serial pole request output
29	BSO	O	P–BUS : Serial data output
30	BSI	I	P–BUS : Serial data input
31	BSCK	O	P–BUS : Clock output
32	NC	O	Not used
33	XSO	O	CD : LSI data output
34	XSI	I	CD : LSI data input
35	XSCK	O	CD : LSI clock output
36	VDCONT	O	VD control output
37	LCCONT	O	LCD drive voltage select output
38–44	NC	O	Not used
45	STSSL	O	STS IC latch output
46	NC	O	Not used
47	XAO	O	CD : LSI data discernment control signal output
48	$\overline{\text{XSTB}}$	O	CD : LSI strobe output
49	$\overline{\text{XRST}}$	O	CD : LSI reset output
50	$\overline{\text{CCS}}$	O	Compression IC chip enable output
51	$\overline{\text{EPCS}}$	I/O	EEPROM detect input , Chip select output
52	FOK	I	CD : LSI focus OK signal input
53	ELVCONT	O	ELV drive voltage select output
54–58	NC	O	Not used
59	STSWAQV	O	STS test output
60	VCC		Power supply
61	STSDEC	O	STS test output
62	VSS2		GND
63	STSENC	O	STS test output
64	STSSTD	O	STS test output
65	STSSTC	O	STS test output
66	STSSTB	O	STS test output
67	STSSTA	O	STS test output
68–71	NC	O	Not used

Pin No.	Pin Name	I/O	Function and Operation
72	HOME2	I	Disc clamp claw sense input
73	SBSY	I	Sub code synchronous interrupt signal input
74	CDMUTE	O	CD : Mute output
75	LO2	O	LOAD motor control 2 output
76	LO1	O	LOAD motor control 1 output
77	ELV2	O	ELV Motor control 2 output
78	ELV1	O	ELV Motor control 1 output
79	HOME	I	Carriage home switch input
80	STS16M	I	STS DRAM 4M/16M(H) select input
81	LOADSW1	I	LOAD operation sense 1 input
82	LOADSW2	I	LOAD operation sense 2 input
83,84	NC		Not used
85	$\overline{\text{ADENA}}$	O	AVREF enable output
86	CG1	O	Cam motor 1 output
87	CG2	O	Cam motor 2 output
88	LOADVOL2	I	LOAD voltage sense 2 input
89	LOADPHT	I	LOAD operation photo sense input
90	LOMMON	O	Not used
91	ELVSENS	I	ELV position select input
92	EREFF		ELV sense reference voltage
93	TEMP	I	CD : Temperature sense input
94	AVSS		A/D converter ground potential
95	VDIN	I	CD : Power supply short sensor input
96	VREF	I	A/D converter reference voltage input
97	AVCC		A/D converter ground
98	STSSI	I	STS IC data input
99	STSSO	O	STS IC data output
100	STSSCK	O	STS IC clock output

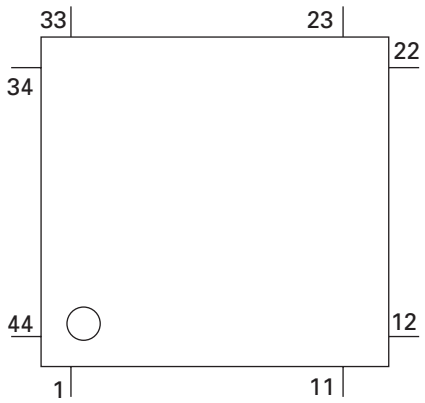
* PD5890A



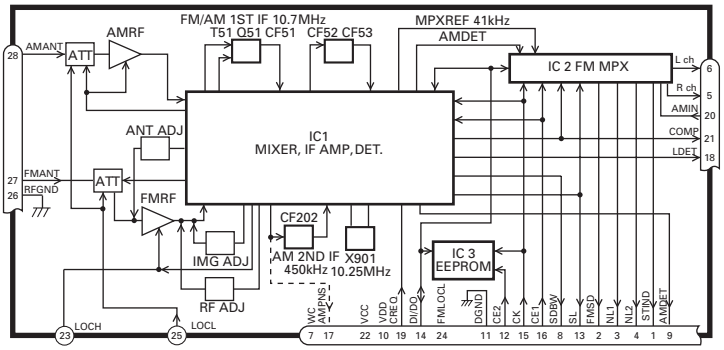
● Pin Functions (SM5903BFP)

Pin No.	Pin Name	I/O	Function and Operation
1	VDD2		Power supply terminal
2-6	UC1-UC5	I/O	Micro computer interface : Extension input / output
7	NC		Not used
8	NTEST	I	Test input
9	CLK	I	Clock input (16.9344MHz)
10	VSS		Ground terminal
11	YSRDATA	I	Audio : Serial data input
12	YLRCK	I	Audio : Serial LR clock input
13	YSCK	I	Audio : Serial bit clock input
14	ZSCK	O	Audio : Serial bit clock output
15	ZLRCK	O	Audio : Serial LR clock output
16	ZSRDATA	O	Audio : Serial data output
17	YFLAG	I	RAM over flow flag input from signal processing IC
18	YFCLK	I	Frame clock input
19	YBLKCK	I	Sub code block clock input
20	NRESET	I	System reset input
21	ZSENSE	O	Micro computer interface : Status output
22	VDD1		Power supply terminal
23	YDMUTE	I	Mute input
24	YMLD	I	Micro computer interface : Latch clock input
25	YMDATA	I	Micro computer interface : Serial data input
26	YMCLK	I	Micro computer interface : Shift clock input
27	A10	O	D-RAM : Address output
28	NCAS	O	D-RAM : $\overline{\text{CAS}}$ control output
29,30	D2,D3	I/O	D-RAM : Data input / output
31,32	D0,D1	I/O	D-RAM : Data input / output
33	NWE	O	D-RAM : $\overline{\text{WE}}$ control output
34	NRAS	O	D-RAM : $\overline{\text{RAS}}$ control output
35-40	A9-A4	O	D-RAM : Address output
41-44	A0-A3	O	D-RAM : Address output

SM5903BFP



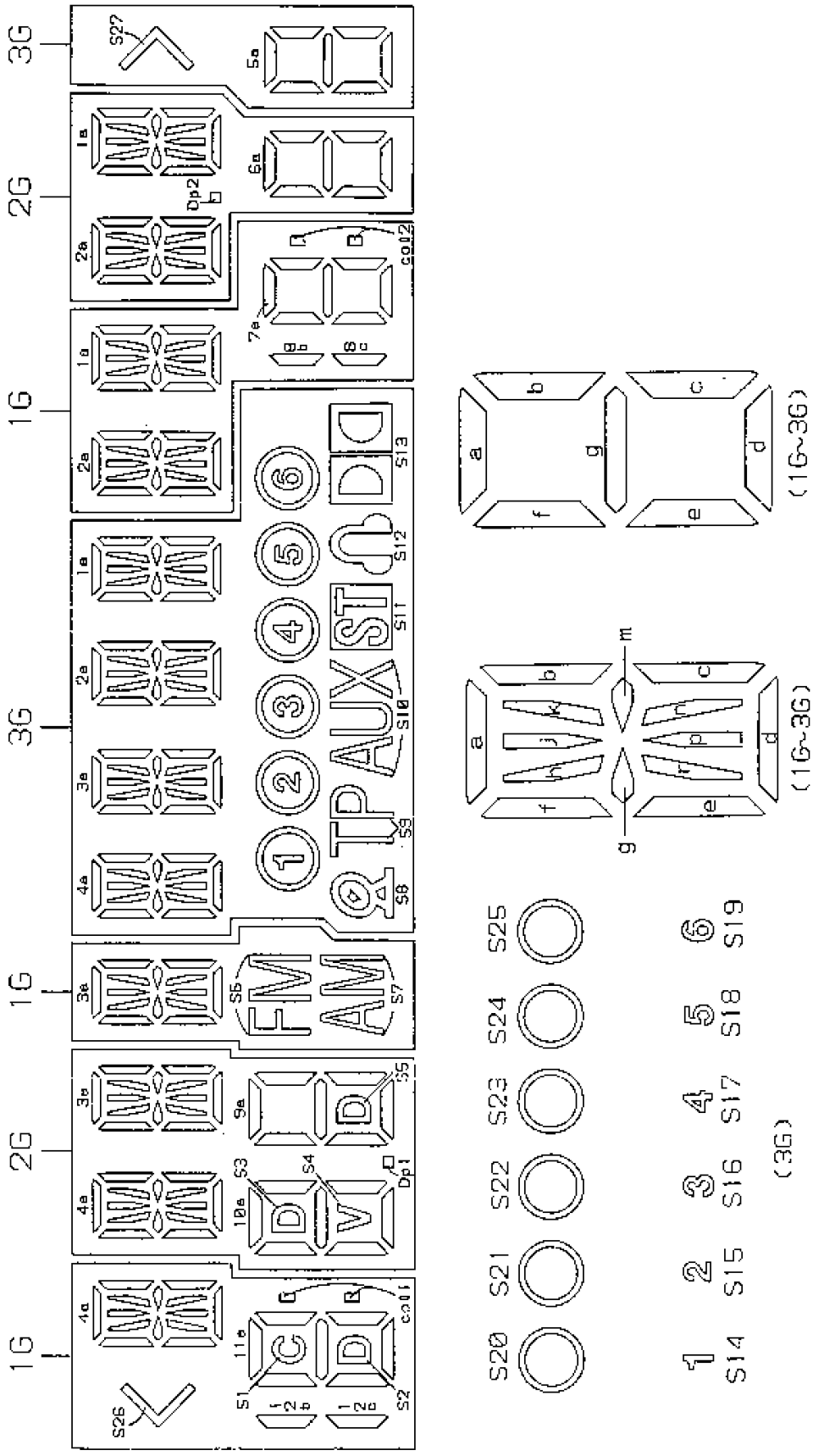
● FM/AM Tuner Unit



No.	Symbol	I/O	Explain	
1	STIND	O	stereo indicator	"Low" when the FM stereo signals are received. To be pulled up to the "VDD" at 47kΩ.
2	FMSD	O	FM station detector	"High" when signals are received. To be pulled up to the "VDD" at 47kΩ Meanwhile, 10kΩ should be used when taking diver FIX trigger from here and "High: 0.9VDD or more" and "Low: 250mV or less". (Should satisfy the diver IC specifications)
3	NL1	O	noise level-1	"High" when noise is received. Output for the RDS. GND at 47kΩ//1,800pF.
4	NL2	O	noise level-2	"High" when noise is received. Output for the RDS. GND at 36kΩ//330pF.
5	Rch	O	R channel output	FM stereo "R-ch" signal output or AM audio output. Add the specified de-emphasis constant.
6	Lch	O	L channel output	FM stereo "L-ch" signal output or AM audio output. Add the specified de-emphasis constant.
7	WC		write control	EEPROM write control. Writing permissible at "Low". Normally open.
8	SDBW	O	SD bandwidth	SD bandwidth signal output. For detection of detuning data for the RDS.
9	AMDET	O	AM detector output	AM detector output. r out < 100Ω
10	VDD		power supply	Power supply pin for the digital section. DC 5V +/- 0.25V. Be careful about overlapping noise in the logic section.
11	DGND		digital ground	Grounding for the digital section.
12	CE2	I	chip enable-2	EEPROM chip enable. Active a "Low" To be pulled up to the "VDD" at 47kΩ
13	SL	I/O	signal level	Received FM/AM signal level (strength) output. Connect the specified load resistor and capacitor (10k Ω+ 39k Ω//4,700pF)
14	DI/DO	I/O	data input/ data output	Data input/Data output To be pulled up to the "VDD" at 47kΩ
15	CK	I	clock	Clock input To be pulled up to the "VDD" at 47kΩ
16	CE1	I	chip enable-1	AF·RF chip enable. Active at "High"To be grounded at 47kΩ
17	AMPNS	O	AM PNS IF signal	IF signal output for AM PNS circuit.
18	LDET	O	lock detector	Active at "Low". To be pulled up to the "VDD" at 47kΩ
19	CREQ	I	current request	Active at "Low". To be grounded at 47kΩ
20	AMINI		AM audio input	The frequency response and the level are set by connecting an external CR network with terminal AMIN as terminal AMDET. r in = 50kΩ
21	COMP	O	composite signal	FM composite signal output. r out < 100Ω
22	VCC		power supply	Analog section power supply pin.DC 8.4V +/- 0.3V
23	LOCH	I	local high	FM local high pin. When seeking local high, apply 5V together with "LOCL".
24	FMLOCL	I	FM local low	FM local low pin. When seeking local low, apply 5V to the base of the NPN transistor with which the specified resistor is being connected to the emitter. Keep it open in case of ordinary marketed models.
25	LOCL	I	local low	FM/AM local low pin. When seeking local low, apply 5V to the base of the NPN transistor.Since this pin is exclusive for AM when the FMLOCL is in use, do not drive it under FM.
26	RFGND		RF ground	Grounding for the antenna section.
27	FMANT	I	FM antenna input	FM antenna input. 75Ω. Surge absorber (DSP-201M-S00B) is necessary.
28	AMANT	I	AM antenna input	AM antenna input. High impedance. Connect to the antenna through an L (LAU type) of 4.7μH.To cope with the power transmission line hums, insert a series circuit consisting of an L (a coil of about 100mH) + R (a resistor of 470 Ω to 2.2kΩ) between the GND.

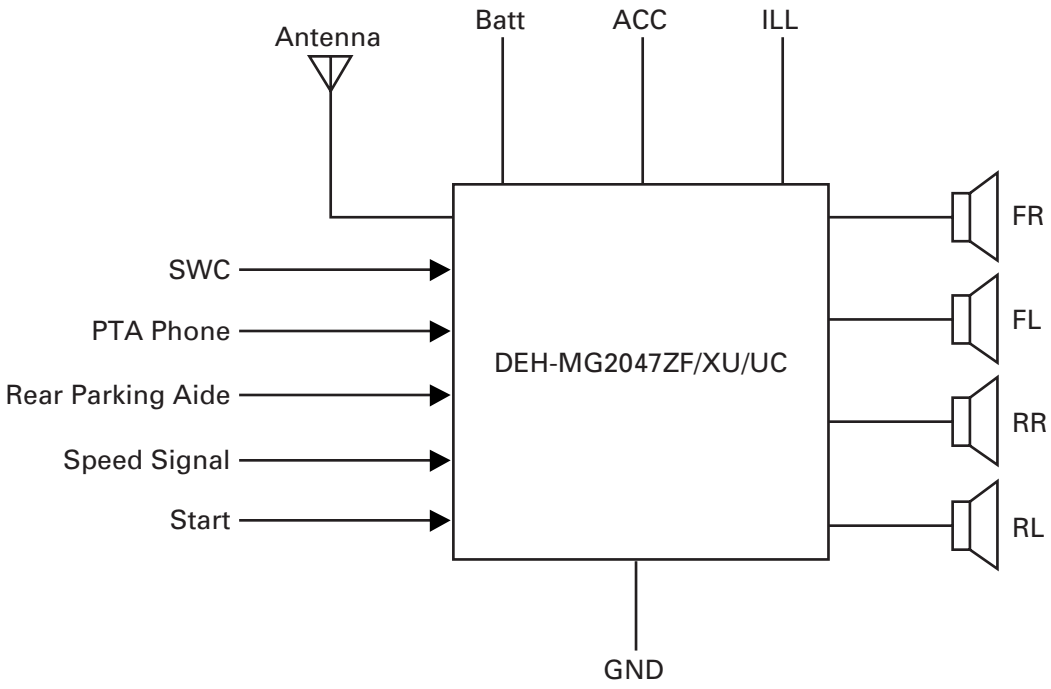
7.2.2 DISPLAY

● **VF (CAW1806)**

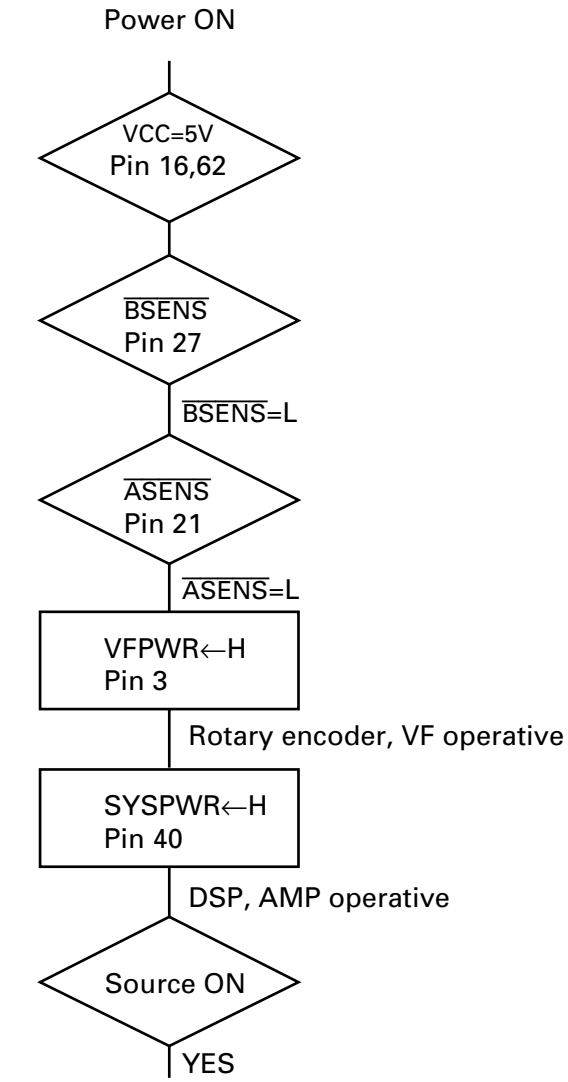


7.3 EXPLANATION

7.3.1 SYSTEM BLOCK DIAGRAM



7.3.2 OPERATIONAL FLOW CHART



Completes power-on operation.
(After that, proceed to each source operation)

7.4 NOTES ON SERVICING

7.4.1 CLEANING

Before shipping out the product, be sure to clean the following portions by using the prescribed cleaning tools:

Portions to be cleaned	Cleaning tools
CD pickup lenses	Cleaning liquid : GEM1004 Cleaning paper : GED-008

Portions to be cleaned	Cleaning tools
Fans	Cleaning paper : GED-008

7.4.2 FACTORY SETTINGS

● When the Repair is Complete

When the Repair is Complete, make the CD mechanism ready for transportation.

Precautions when removing the radio unit (to prevent damage during shipment)

- **Remove all discs loading in this product before disconnecting the power supply connector (vehicle harness).**

⇩ If discs have been removed

- Set this product to the "Shipment mode" and then disconnect the power supply connector before shipping.

⇩

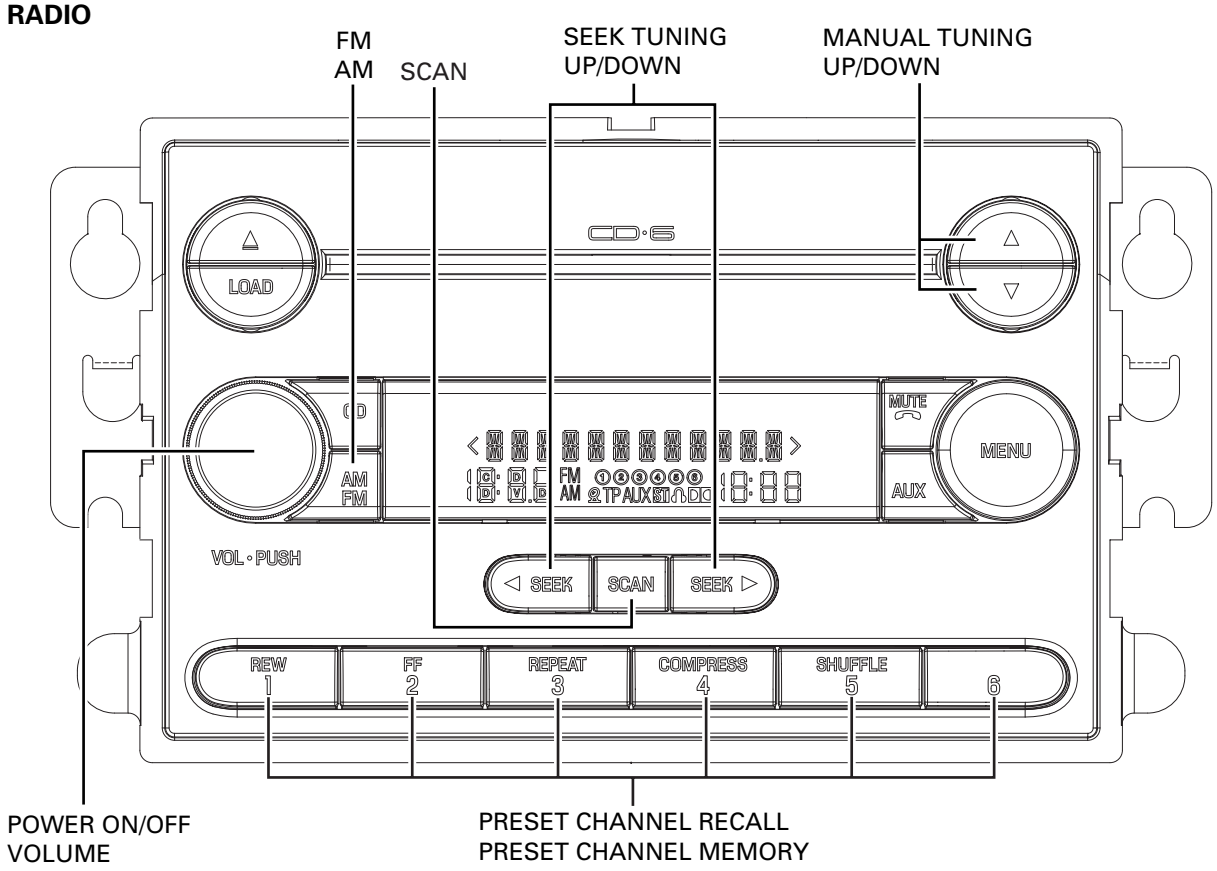
- **Setting the "Shipment mode"**
  From ACC ON and CD OFF state, press "1" button and "SCAN" button at the same time for 1.5sec or more
- **Confirming "Shipment mode" setting**
  When Shipment mode setting is started, "SHIPMENT" on display blinks and "SHIPMENT ON" for the completion of the setting.

⇩ If discs cannot be removed

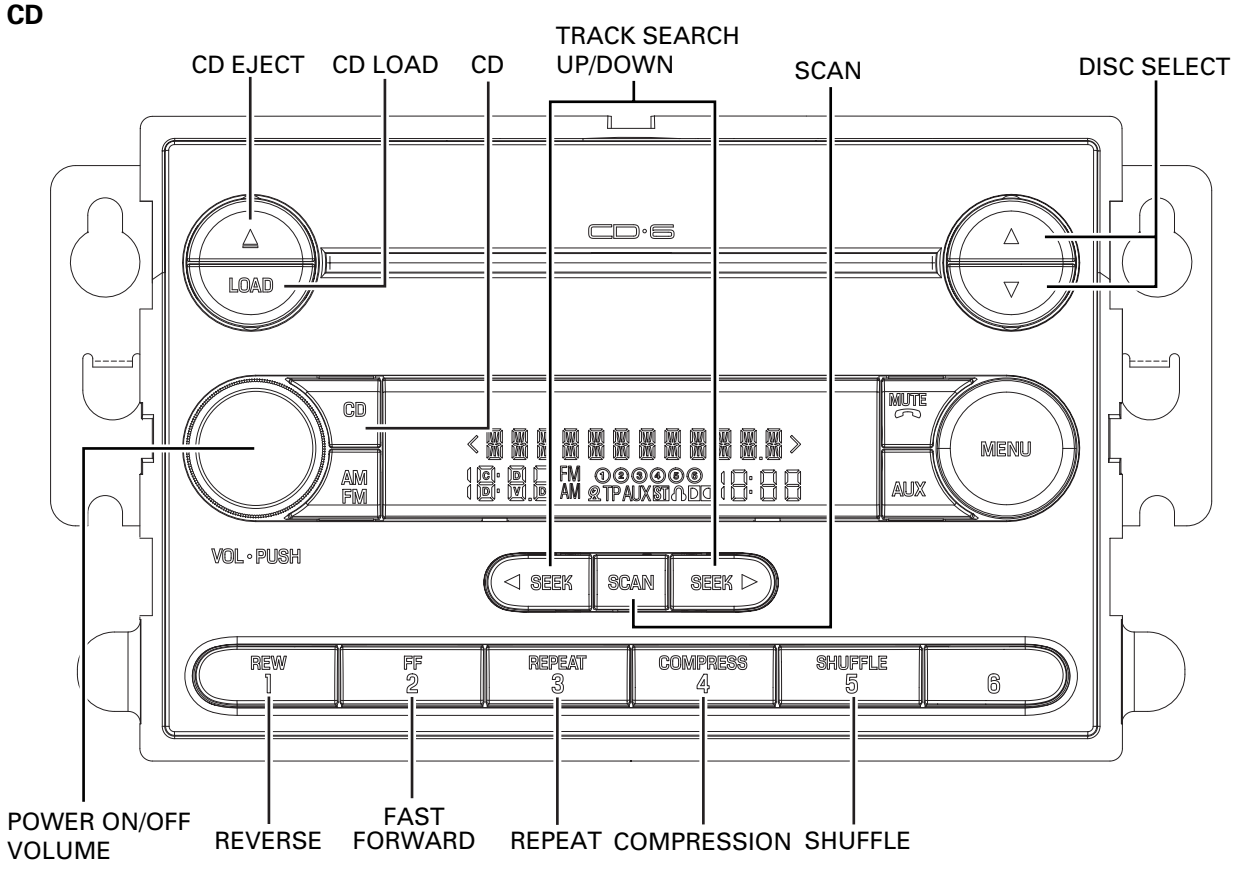
- Disconnect the power supply connector and ship the unit with the discs loaded.

8. OPERATIONS

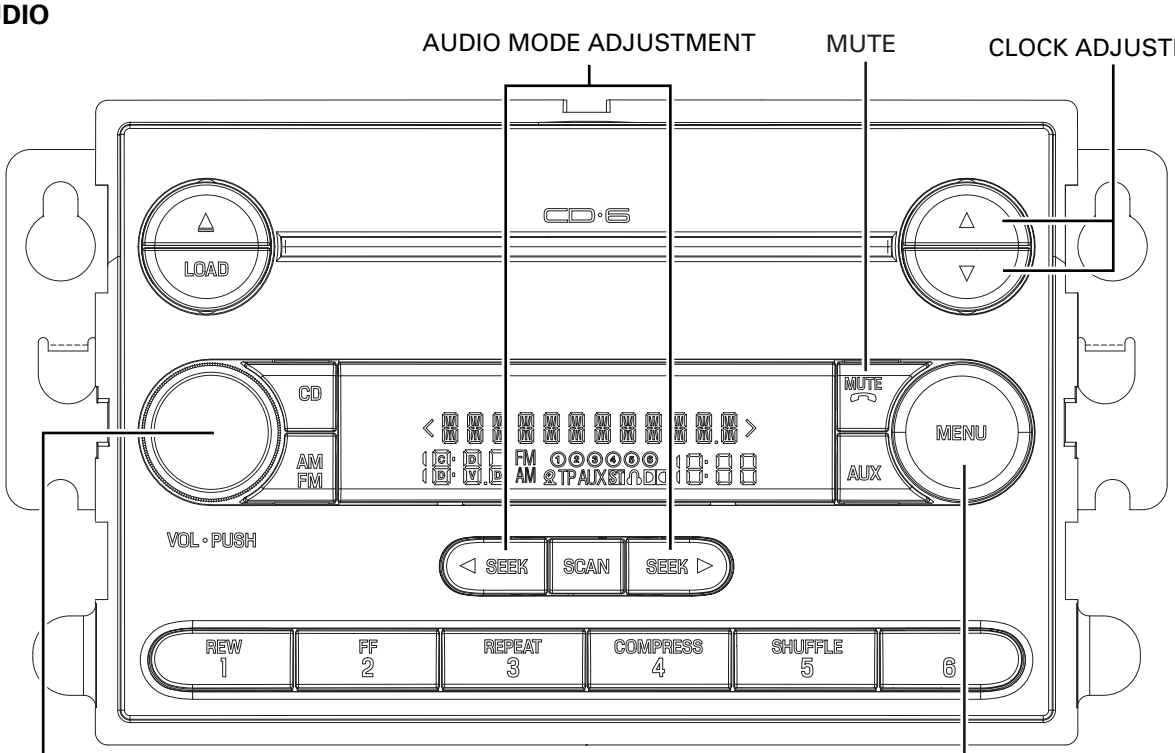
● **RADIO**



● **CD**



● AUDIO


AUDIO MODE ADJUSTMENT
MUTE
CLOCK ADJUSTMENT
LOAD
CD
AM
FM
MUTE
MENU
AUX
VOL • PUSH
SEEK
SCAN
SEEK
REW
1
FF
2
REPEAT
3
COMPRESS
4
SHUFFLE
5
6
POWER ON/OFF
VOLUME
AUDIO MODE SELECT
• BALANCE
• FADER
• BASS
• TREBLE
CLOCK ADJUST MODE

● Jigs List

Name	Jig No.	Remarks
Test Disc	TCD-784	Checking the grating
L.P.F.		Checking the grating (Two pieces)
Cleaning liquid	GEM1004	Cleaning CD pickup lenses
Cleaning paper	GED-008	Cleaning CD pickup lenses and fans
Extension cable	GGD1250	Cautions on replacing the CD mechanism unit

Pioneer sound.vision.soul

Service Manual

ORDER NO.
CRT2872

CD MECHANISM MODULE

CX-951

- **This service manual describes the operation of the CD mechanism incorporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model No.	Order No.	CD Mechanism Module
FX-MG9127ZT/UC	CRT2903	CXK7110
FX-MG9327ZT/ES	CRT2904	CXK7110
FX-MG9427ZT/ES	CRT2904	CXK7110
FX-MG9527ZT/Q1	CRT2904	CXK7110
FX-MG9327ZT/EW	CRT2905	CXK7110
FX-MG9427ZT/EW	CRT2905	CXK7110
FX-MG9727ZT/UC	CRT2905	CXK7110

CONTENTS

PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER EUROPE NV Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

K-ZZS. JULY 2002 Printed in Japan

1. CIRCUIT DESCRIPTIONS

The LSI (UPD63711GC) used on this unit comprises six main blocks ; the pre-amp section, servo, signal processor, DAC, CD text decoder and LPF. It also equips with nine automatic adjustment functions.

1.1 PRE-AMP SECTION

This section processes the pickup output signals to create the signals for the servo, demodulator and control.

The pickup output signals are I-V converted by the pre-amp with the built-in photo-detector in the pickup, then added by the RF amp to obtain RF, FE, TE, TE zero cross and other signals.

This pre-amp section is built in the servo LSI UPD63711GC (IC201). The following describes function of each section.

Since this system has a single power supply (+5V), the reference voltage for this LSI and pickup are set to REFO (2.5V). The REFO is obtained by passing the REFOUT from the LSI through the buffer amplifier. The REFO is output from Pin 89 of this LSI. All measurements are done using this REFO as reference.

Note : During the measurement, do not try to short the REFO and GND.

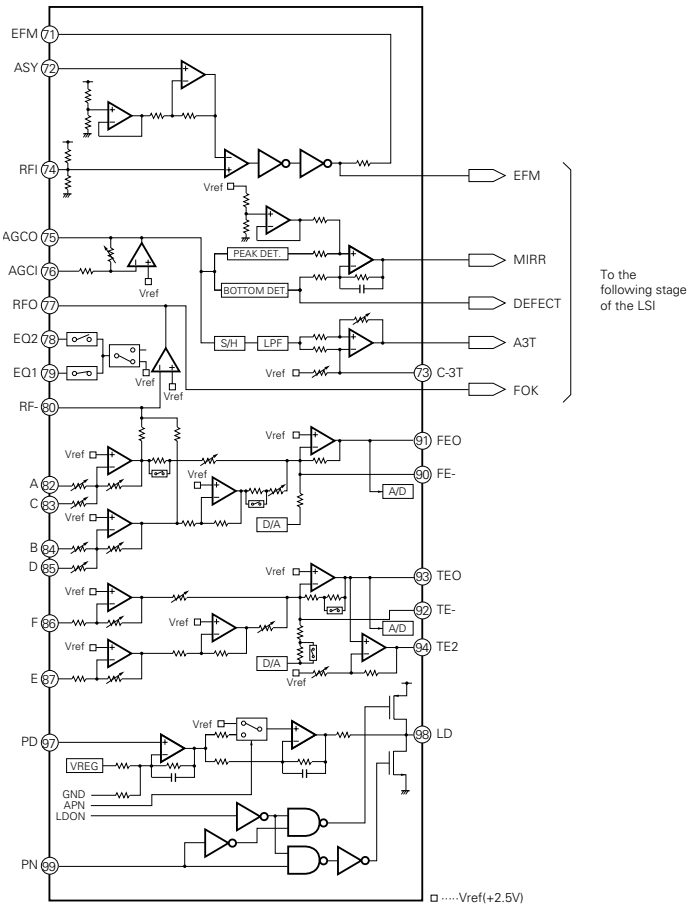


Fig.1 : BLOCK DIAGRAM OF BUILT-IN RF AMPLIFIER

1) APC Circuit (Automatic Power Control)

When the laser diode is driven with constant current, the optical output has large negative temperature characteristics. Thus, the current must be controlled from the monitor diode so that the output may be constant. APC circuit is for it. The LD current is obtained by measuring the voltage between LD1 and V+5. The value of this current is about 35mA.

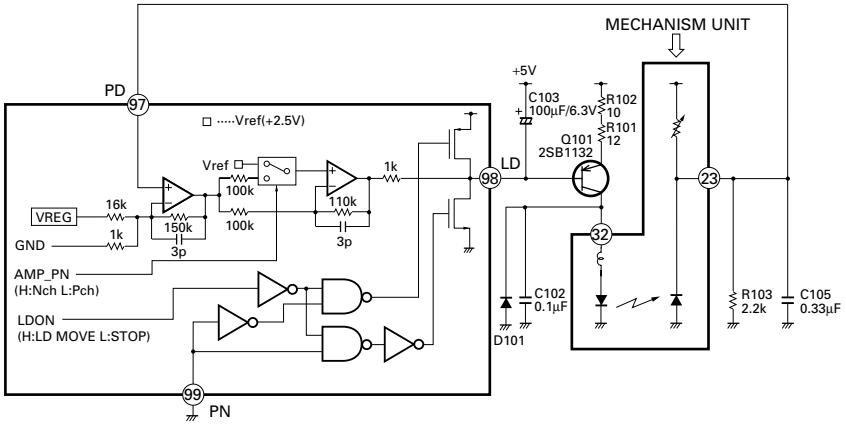


Fig.2 : APC CIRCUIT

2) RF Amplifier and RFAGC Amplifier

The photo-detector outputs (A + C) and (B + D) are added, amplified and equalized on this LSI and then output to the RFI terminal as the RF signal. (The eye pattern can be checked by this signal.)

The RFI voltage low frequency component is :

$$RFI = (A + B + C + D) \times 3.2$$

RFI is used on the FOK generator circuit and RF offset adjusting circuit.

R207 is an offset resistor for maintaining the bottom reference voltage of the RFI signal at 1.5 VDC. The D/A output used for the RF offset adjustment (to be described later) is entered via this resistor.

After the RFI signal from Pin 77 is externally AC coupled, entered to Pin 76 again, then amplified on the RFAGC amplifier to obtain the RFO signal.

The RFAGC adjustment function (to be described later) built-in the LSI is used for switching feedback gain of the RFAGC amplifier so that the RFO output may go to 1.5 ± 0.3Vpp.

The RFO signal is used for the EFM, DFCT, MIRR and RFAGC adjustment circuits.

3) RFOK Circuit

This circuit generates the signal that is used for indicating the timing of closing the focus or state of the focus close currently being played. This signal is output from Pin 4 as the FOK signal. It goes high when the focus close and in-play.

The RFOK signal is generated by holding DC level of the RFI at its peak with the succeeding digital section, then comparing it at a specific threshold level. Thus, the RFOK signal goes high even if the pit is absent. It indicates that the focus close can take place on the disc mirror surface, too.

This signal is also supplied to the micro computer via the low pass filter as the FOK signal and used for the protection and the RF amplifier gain switching.

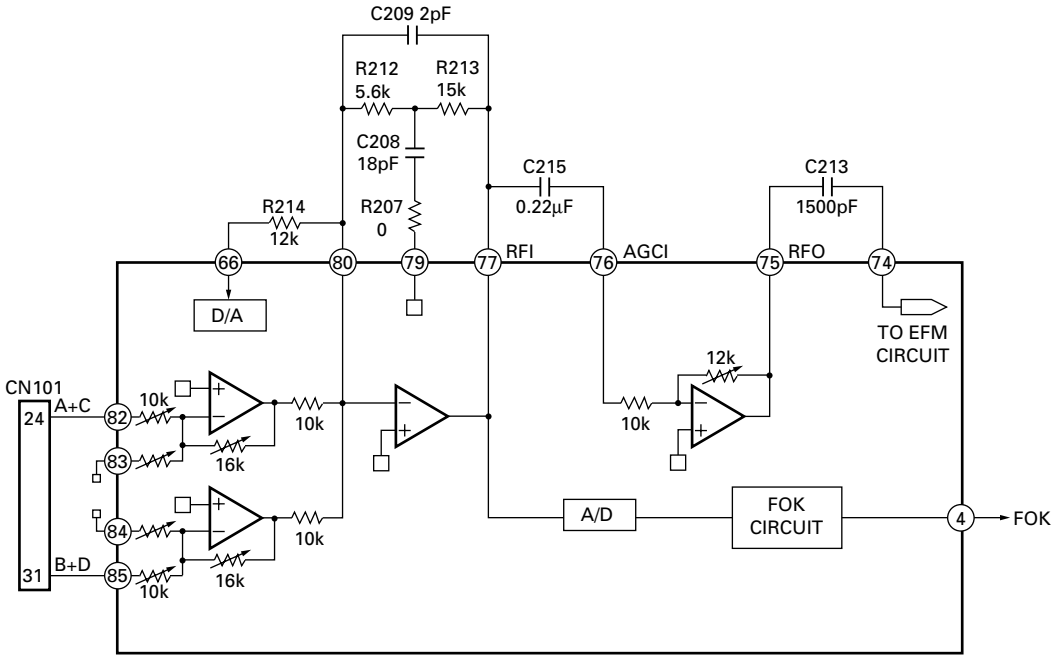


Fig.3 : RFAMP, RFAGC AND FOK CIRCUIT

4) Focus Error Amplifier

The photo-detector outputs (A + C) and (B + D) are passed through a differential amplifier and an error amplifier, and then (A + C – B – D) is output from Pin 91 as the FE signal. The FE voltage low frequency component is :

$$FE = (A + C - B - D) \times \frac{16k}{10k} \times \frac{80k}{(20k + 5k)}$$

$$= (A + C - B - D) \times 5$$

Using REFO as the reference, an S-curve of approximately 1.5 Vpp is obtained for the FE output. The final-stage amplifier cutoff frequency is 11.4 kHz.

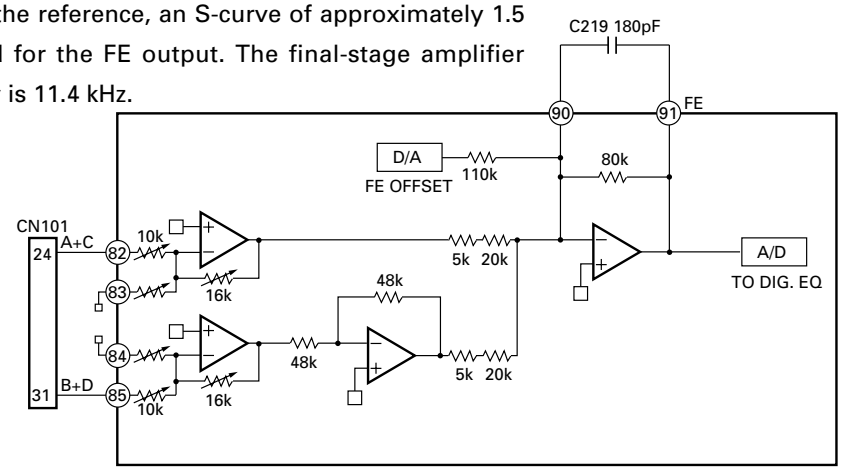


Fig.4 : FOCUS ERROR AMPLIFIER

5) Tracking Error Amplifier

The photo-detector outputs E and F are passed through a differential amplifier and an error amplifier, and then (E – F) is output from Pin 93 as the TE signal. The TE voltage low frequency component is :

$$TE = (E - F) \times \frac{224k}{112k} \times \frac{160k}{48.7k}$$

$$= (E - F) \times 6.6 \text{ (Effective LSI output is 5.0).}$$

Using REFO as the reference, the TE waveform of approximately 1.3 Vpp is obtained for the TE output. The final-stage amplifier cutoff frequency is 20 kHz.

6) Tracking Zero Crossing Amplifier

TEC signal (the tracking zero crossing signal) is obtained by multiplying the TE signal four times. It is used for locating the zero crossing points of the tracking error. The zero cross point detection is done for the following two reasons :

① To count tracks for carriage moves and track jumps.

② To detect the direction in which the lens is moving when the tracking is closed (it is used on the tracking brake circuit to be described later).

The TEC signal frequency range is 300 Hz to 20 kHz.

TEC voltage = TE level × 4

Theoretical TEC level is 5.2V. The signal exceeds D-range of the operational amplifier and thus is clipped. It, however, can be ignored since this signal is used by the servo LSI only at the zero crossing point.

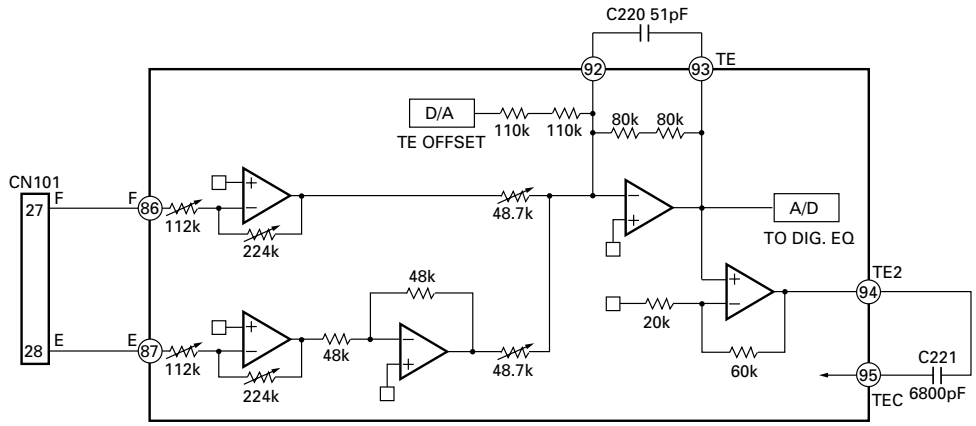


Fig.5 TRACKING ERROR AMPLIFIER AND TRACKING ZERO CROSSING AMPLIFIER

7) DFCT (Defect) Circuit

The DFCT signal is used for detecting defects on the mirrored disc surface. It allows monitoring from the HOLD pin (Pin 2). It goes high when defects are found on the mirrored surface.

The DFCT signal is generated by comparing the RF amplified signal (which is obtained by bottom holding the RFO signal) at a specific threshold level by the succeeding digital section.

Stains or scratches on the disc can constitute the defects on the mirrored disc surface. Thus, as long as the DFCT signal remains high in the LSI, the focus and tracking servo drives are held in the current state so that a better defect prevention may be ensured.

8) 3TOUT Circuit

The 3TOUT signal is generated by entering disturbance to the focus servo loop, comparing phase of fluctuations of the RF signal 3T component against that of the FE signal at that time, then converting the signal to DC level. This signal is used for adjusting bias of the FE signal (to be described later). This signal is not output from the LSI, thus its monitoring is not available.

9) MIRR (Mirror) Circuit

The MIRR signal shows the on track and off track data, and is output from Pin 3.

When the laser beam is

On track : MIRR = "L"

Off track : MIRR = "H"

This signal is used on the brake circuit (to be described later) and also as the trigger to turn on track counting when jumping take place.

The MIRR signal is supplied to the micro computer, too, for the protection purpose.

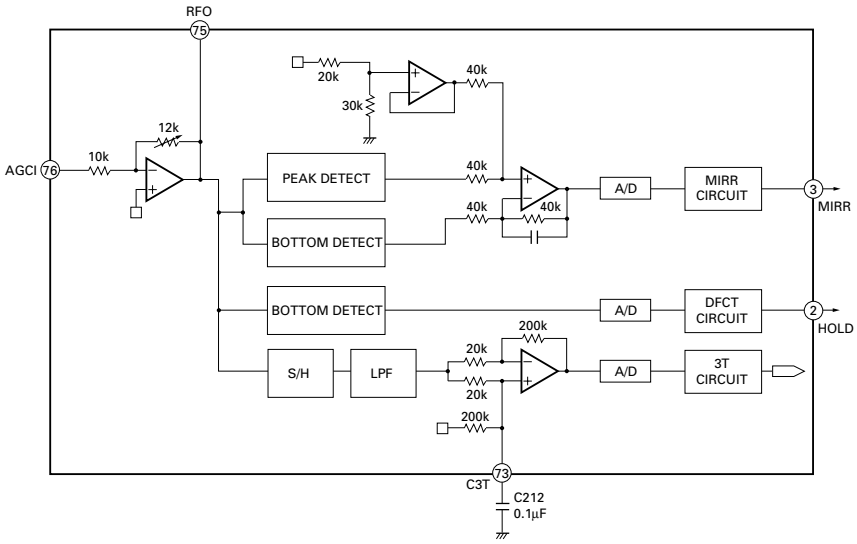


Fig.6 : DFCT, MIRR AND 3T DETECTION CIRCUIT

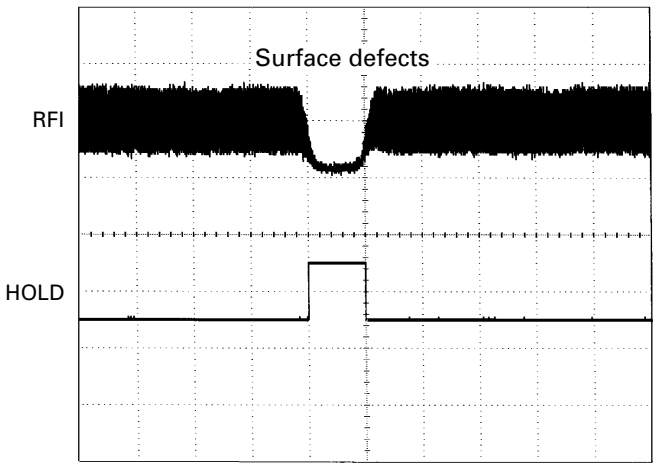


Fig.7 : HOLD OUTPUT WAVEFORM
(When surface defects are present)

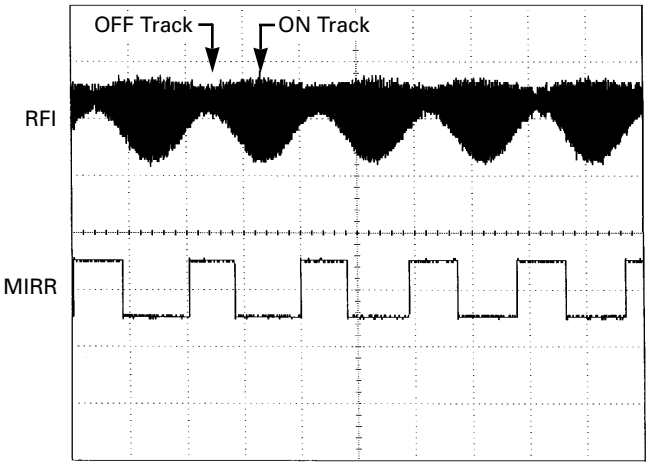


Fig.8 : MIRR OUTPUT WAVEFORM
(When an access is made)

10) EFM Circuit

This circuit is used for converting the RF signal to digital signal consisting of “0” and “1”. The RFO signal from Pin 75 is externally AC coupled, entered to Pin 74, then applied to the EFM circuit.

Loss of the RF signal due to scratches or stains on the disc, or vertical asymmetry of the RF due to variations in the discs manufactured can’t be eliminated by AC coupling alone. This circuit, therefore, controls the reference voltage ASY on the EFM comparator by use of the fact that “0” and “1” appear fifty fifty in the EFM signal. By this arrangement, the comparate level is constantly maintained at almost center of the RFO signal level. The reference voltage ASY is generated when the EFM comparator output is passed through the low pass filter. The EFM signal is output from Pin 71. It is a 2.5 Vp-p amplitude signal centering on REFO.

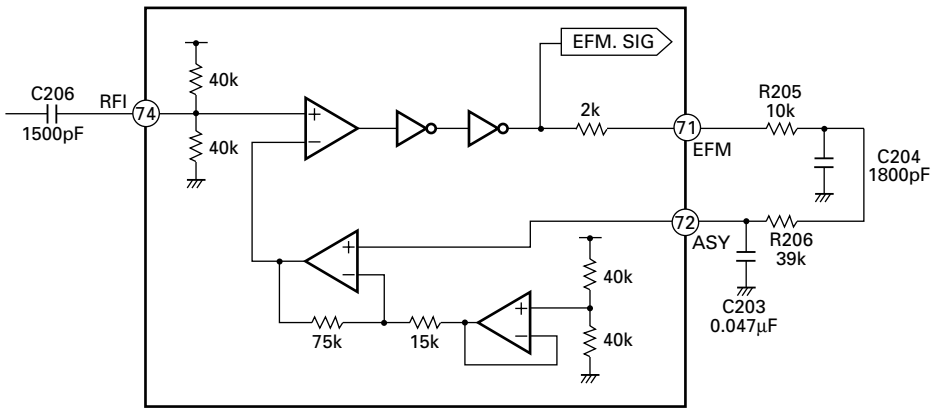


Fig.9 : EFM CIRCUIT

1.2 SERVO SECTION (UPD63711GC : IC201)

The servo section controls the operations such as error signal equalizing, in focus, track jump and carriage move. The DSP is the signal processing section used for data decoding, error correction and interpolation processing, among others.
This circuit implements analog to digital conversion of the FE and TE signals generated on the pre-amplifier, then outputs them through the servo block as the drive signal used on the focus, tracking and carriage system. The EFM signal is decoded on the signal processing section and finally output via the D/A converter as the audio signal. The decoding process also generates the spindle servo error signals which is fed to the spindle servo block to generate the spindle drive signal.
The focus, tracking, carriage and spindle drive signals are then amplified on the driver IC BD7962FM (IC301) and fed to respective actuators and motors.

1) Focus Servo System

The focus servo main equalizer is consisted of the digital equalizer. Fig.10 shows the focus servo block diagram.
When implementing the focus close on the focus servo system, the lens must be brought within the in-focus range. Therefore, the lens is moved up and down according to the triangular focus search voltage to find the focus point. During this time, the spindle motor is kicked and kept rotating as a set speed.
The servo LSI monitors the FE and RFOK signals and automatically carries out the focus close at an appropriate point.
The focus closing is carried out when the following three conditions are met :

① The lens approaches the disc from its current position.
② RFOK = "H"
③ The FZC signal is latched at high after it has once crossed the threshold set on the FZD register (Edge of the FZD).

As the result, the FE (= REFO) is forced to low.

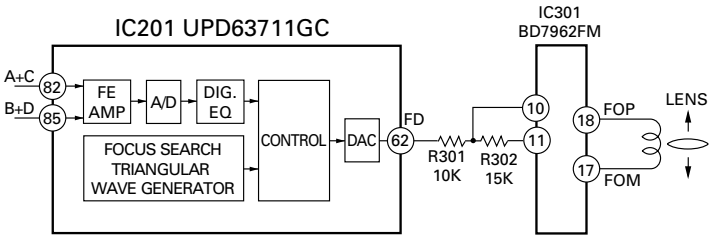


Fig.10 : FOCUS SERVO BLOCK DIAGRAM

When the above conditions are all met and the focus is closed, the XSI pin goes to low from the current high, then 40 ms later, the microcomputer begins to monitor the RFOK signal after it that has been passed through the low pass filter.

When the RFOK signal is recognized as low, the micro computer carries out various actions including protection.

Fig.11 a series of operations carried out relevant to the focus close (the figure shows the case where focus close is not available).

You can check the S-curve, search voltage and actual lens behavior by selecting the Display 01 for the focus mode select in the test mode, and then pressing the focus close button.

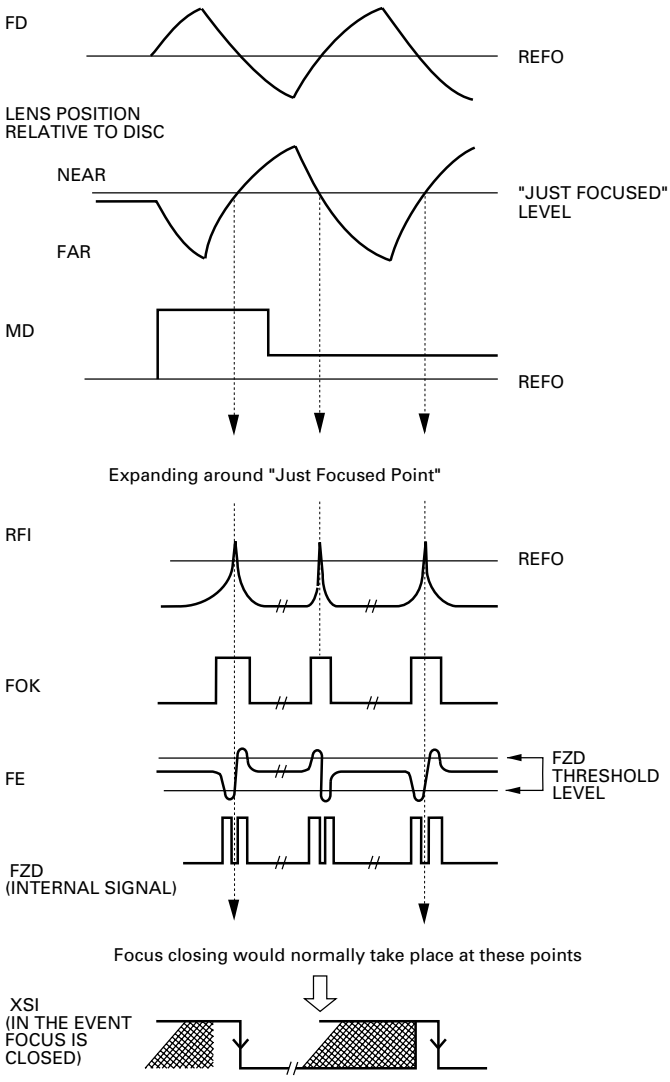


Fig.11 : FOCUS CLOSE SEQUENCE

2) Tracking Servo System

The digital equalizer is employed for the main equalizer on the tracking servo. Fig.12 shows the tracking servo block diagram.

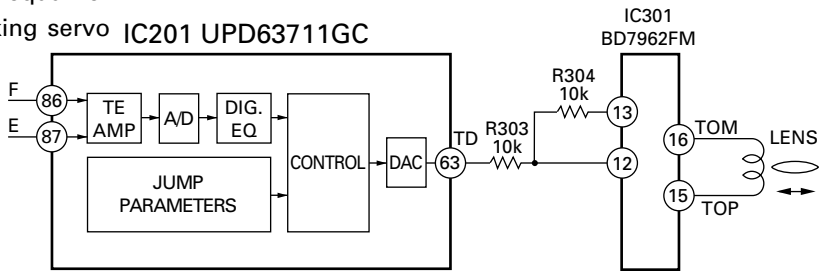


Fig.12 : TRACKING SERVO BLOCK DIAGRAM

a) Track jump

When the LSI receives the track jump command from the microcomputer, the operation is carried out automatically by the auto sequence function of the LSI. This system has five types of track jumps used for the search : 1, 4, 10, 32 and 32 × 3. In the test mode, in addition to three jumps (1, 32 and 32 × 3), move of the carriage can be check by mode selection. For track jumps, the microcomputer sets almost half of tracks (5 tracks for 10 tracks, for instance) and counts the set number of tracks using the TEC signals. When the microcomputer has counted the set number of tracks, it outputs the brake pulse for a fixed period of time (duration can be specified with the command) to stop the lens. In this way, the tracking is closed and normal play is continued.

To improve the servo loop retracting performance just after the track jump, the brake circuit is turned on for 50 ms after the brake pulse has been terminated to increase gain of the tracking servo.

Fast forward and reverse operations are realized by through consecutive signal track jumps. The speed is about 10(or 20) times as fast as that in the normal mode.

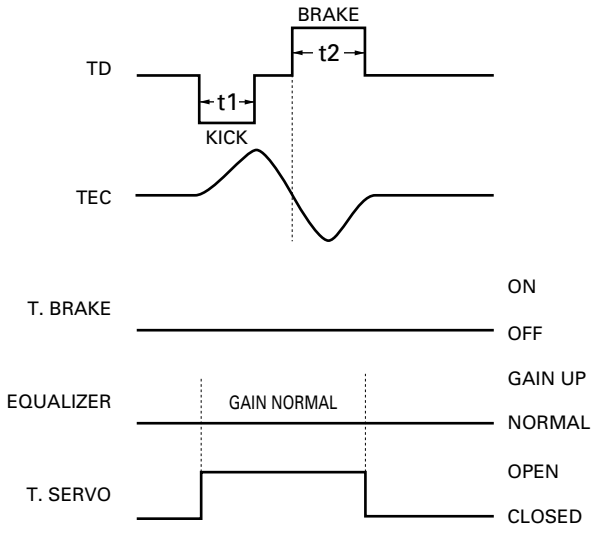


Fig.13 : SINGLE TRACK JUMP

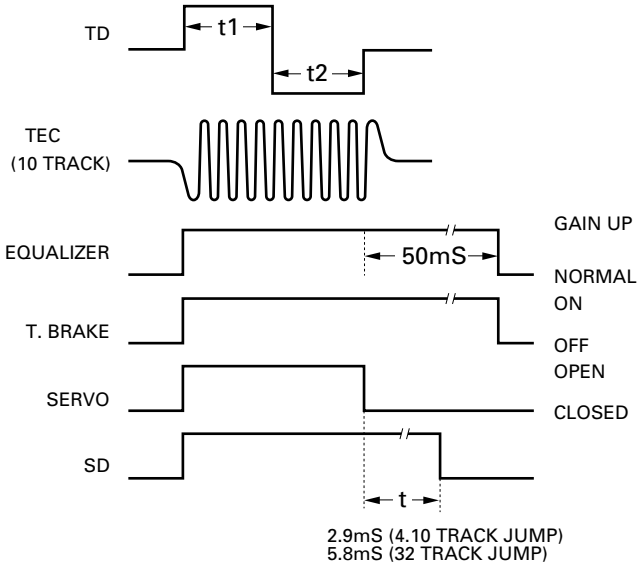
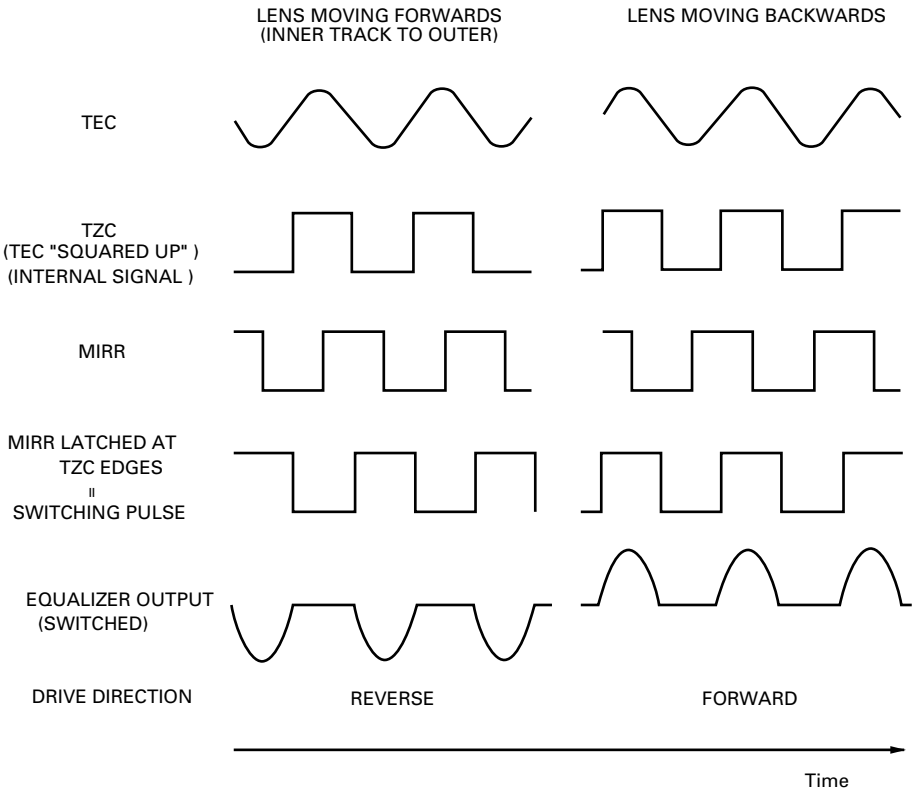


Fig.14 : MULTI-TRACK JUMP

b) Brake Circuit

The servo retracting performance can be deteriorate during the setup or track jump operation. In this connection, the brake circuit is used to ensure steady retract of the tracking servo. The brake circuit detects in which direction the lens is moving, then slows down its move by outputting the drive signal that moves the lens into the opposite direction alone. Track slippage direction is determined by referencing the TEC and MIRR signals and their phase.



Note : Equalizer output assumed to hava same phase as TEC.

Fig.15 : TRACKING BRAKE CIRCUIT

3) Carriage Servo System

The carriage servo supplies the tracking equalizer's low-frequency component (lens position data) output to the carriage equalizer, then, after providing a fixed amount of gain to it, outputs the drive signal from the LSI. This signal is then applied to the carriage motor via the driver IC.

When the lens offset reaches a certain level during play, the entire pickup must be moved into the forward direction. Therefore, the equalizer gain is set to the level that allows to generate a voltage higher than the carriage motor starting voltage. In actual operations, a certain threshold level is set for the equalizer output by the servo LSI so that the drive voltage may be output from the servo LSI only when the equalizer output exceeds the threshold level. This arrangement helps reducing power consumption. Also, due to disc eccentricity or other factors, the equalizer output may cross the threshold level a number of times. In this case, the drive voltage output from the LSI will have pulse-like waveform.

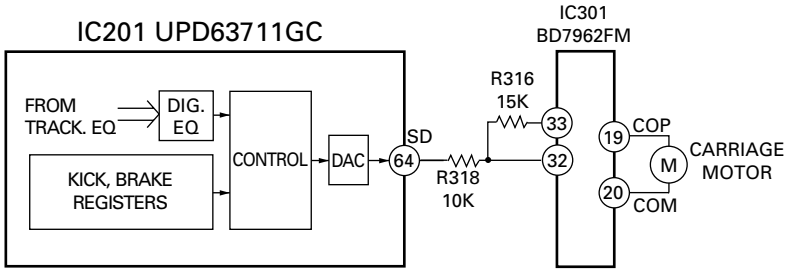


Fig.16 : CARRIAGE SERVO BLOCK DIAGRAM

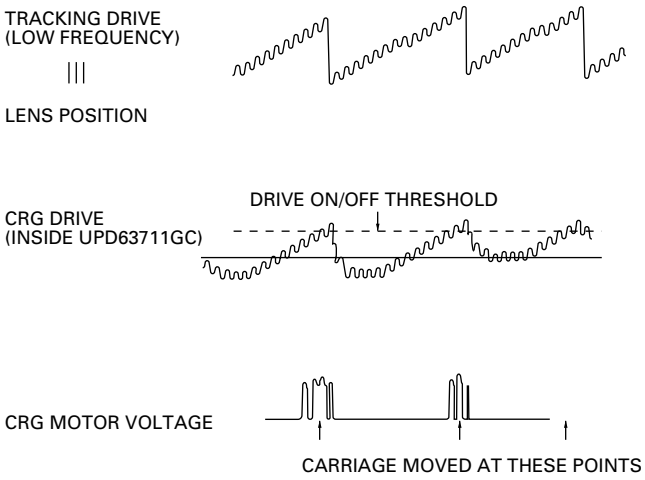


Fig.17 : CARRIAGE SIGNAL WAVEFORM

4) Spindle Servo System

1. Simple FG servo:

This servo is to keep the disc rotation stable around the appropriate speed.

The microcomputer monitors the FG signal, which generates pulses depending on the spindle motor rotation, to control the spindle motor drive voltage.

This mode is used under the following conditions:

a) At setup, for the period from power on, focus close to rough servo mode.

b) After focus is unlocked during play and until it is locked again.

2. Applicable servo :

The CLV servo mode is turned on for the normal operations.

In the EFM demodulation block, the frame sync signal and internal counter output signal are sampled for every WFCK/16 and a signal is produced for indicating whether or not they are matching.

They are determined to be asynchronous only when this signal fails to match 8 times in succession. In all other cases, above two signals are assumed to be synchronous. In the applicable servo mode, the retracting servo is automatically selected if the two signals are synchronous. If not, the regular servo is automatically selected.

3. Brake:

This mode is to stop the spindle motor.

The microcomputer monitors the FG pulse signal. When the FG pulse interval (speed) exceeds the prescribed level, the full brake mode is selected. When the speed slows down to that level or lower, the brake level is decreased. At last the spindle motor is stopped.

4. Stop :

This mode is used for powering on the system and the eject operation. When this mode is turned on, voltage across the spindle motor is 0V.

5. Rough servo :

This mode is used for when the carriage feed (carriage mode for the long search, etc.) is turned on. The linear speed is calculated from the EFM waveform and high or low level is entered to the spindle equalizer. In the test mode, this mode is also used for the grating check.

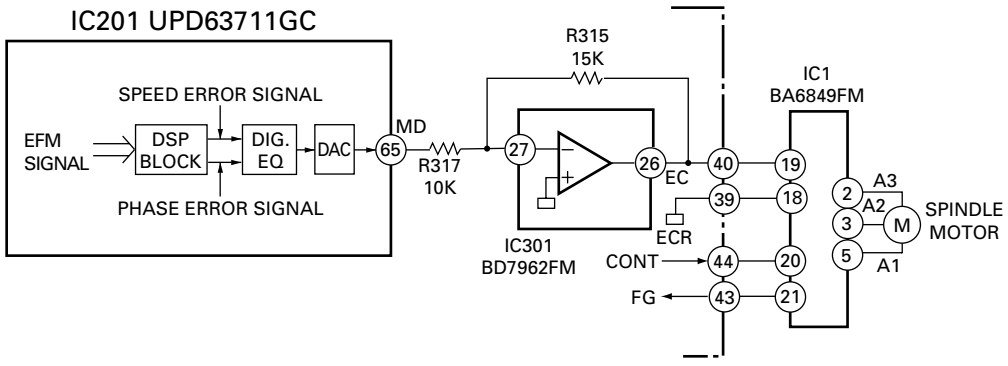


Fig.18 : SPINDLE SERVO MOTOR BLOCK DIAGRAM

1.3 AUTOMATIC ADJUSTMENT FUNC- TIONS

Every circuit adjustment on the CD-LSI of this system is automated.
Every circuit adjustment is automatically implemented when the disc is inserted or the CD mode is selected from the source key. The following describes how the adjustments are executed.

1) FZD Cancel Setting

This setting is used for executing the focus close operation without fail.
When power is turned on, the FE offset level is read and a voltage opposite to this offset value is written to the CRAM on the IC to cancel the offset. In this manner, the FZD threshold level can be set to a constant value (+240mV), thereby ensuring to meet one of the requirements for the IC to execute the focus close that "the FZD signal is latched at high".

2) Automatic Adjustment of TE, FE and RF Offset

Using REFO as the reference, this function adjusts the pre-amp TE, FE and RF offsets to the respective target value when power is turned on (targets values of the TE, FE and RF are 0, 0 and –1V, respectively).
The following is the adjustment procedure :

(1) Respective offset (LD off) is read by the microcomputer via the servo LSI.
(2) The microcomputer calculates the voltages to be corrected from the read values, then sets them to the specified field.

3) Automatic Adjustment of Tracking Balance (T. BAL)

This adjustment is used for eliminating differences between the pickup E and F channels outputs by adjusting gain of the amplifier on the LSI. In the actual operation, the TE waveform is adjusted so that it may be vertically symmetric with REFO.
The following is the adjustment procedure :

(1) Make sure the focus close is complete.
(2) Kick the lens in the radial direction to generate the TE waveform.
(3) At this time, the microcomputer reads the TE signal offset value (via the servo LSI) being calculated by the LSI.
(4) The microcomputer determines if the read offset value is positive, negative or zero.
If the offset value = 0, the adjustment is terminated.
If the offset value = A positive or negative value, gain of the E and F channels amplifiers are modified according the predetermined rule.

Then above steps (2) through (4) are repeated until the "Offset value = 0" or "Specified limit count" is reached.

4) Automatic Adjustment of FE Bias

This adjustment is intended at maximizing the RFI level by optimizing the focus point in-play. This adjustment utilizes the phase difference between the RF waveform 3T level and the focus error signal when disturbance is applied.
Since disturbance is applied to the focus loop, this adjustment is designed to take place in the same timing as the auto gain control (to be described later).
The following is the adjustment procedure :

(1) Disturbance is injected to the focus loop by the command from the microcomputer (within the servo LSI).
(2) The LSI detects fluctuation of the RF signal 3T component level.
(3) The LSI determines relationship between fluctuation of the 3T component and the injected disturbance to detect magnitude and direction of the off-focus introduced.
(4) The microcomputer reads the detected results from the LSI.
(5) The microcomputer calculates necessary correction, then hands the calculated value to the bias adjustment term set on the LSI.

This adjustment is repeated several times, as it is so with the auto gain control, to ensure higher accuracy.

5) Focus and Tracking Automatic Gain Control

This function is used for implementing automatic control of the focus and tracking loop gain.

The following is the adjustment procedure :

(1) Inject disturbance to the servo loop.

(2) Extract the error signal (FE and TE) generated at when the disturbance is applied to obtain the signals G1 and G2 via the B.P.F.

(3) The microcomputer reads the G1 and G2 signals via the LSI.

(4) Based on the necessary correction calculated by the microcomputer, the LSI performs the loop gain adjustment.

Above adjustments are repeated several times to ensure higher adjustment accuracy.

6) Automatic RF Level Adjustment (RFAGC)

This adjustment is used for implementing intended signal transmission successfully by adjusting unevenness of the RF signal (RFO) levels, that results from disc and machine relevant factors, to a target value. The adjustment is actually done by varying gain of the amplifier provided between the RFI and RFO.

The following is the adjustment procedure :

(1) Using the command, the microcomputer reads the output from the RF level detection circuit on the servo LSI.

(2) Based on the read value, the microcomputer calculates an amplifier gain that will produce the target RFO level.

(3) The microcomputer sends the corresponding command to the servo LSI so that the above gain value may be set.

This adjustment takes place at the following timing :

- When the focus close alone is completed during the setup process.
- Just before the setup is completed (just before the play takes place).
- After the off-focus has been corrected during the play.

7) Adjustment of Pre-Amp Stage Gain

It is used for adjusting the entire RFAMP (FE, TE and RF amplifiers) to +6dB or +12dB depending on given gain level when reflected light from the disc is significantly below the required level due to stained lens. This phenomena can be noticed when playing back the CD-RW.

The following is the adjustment procedure :

When reflected light from disc is judged to be significantly below the required level during the setup, set the entire RFAMP to +6dB or +12dB. In this case, if the gain is modified, the setup have to be repeated from the first step.

Through the adjustment, if you judged the play becomes available by setting the entire RFAMP to +6dB, +6dB should be selected for the setup next time on.

See the figure below :

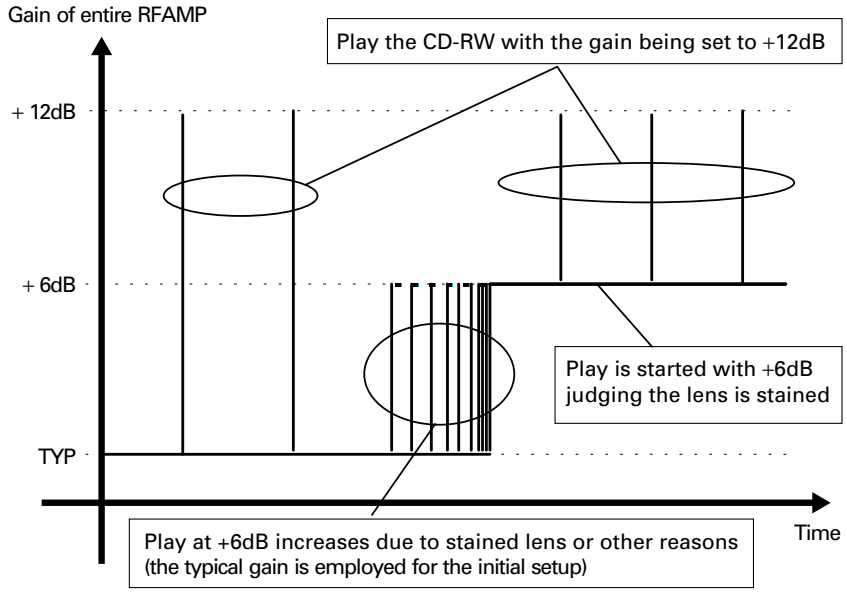


Fig.19 : CONCEPTUAL DIAGRAM OF PRE-AMP GAIN ADJUSTMENT

8) Initial Adjusting Values

All the automatic adjustments are implemented using the previous adjustment values as the initial values unless the microcomputer power (the backup power) is not turned off (though there are some exceptions).
When the backup is turned off, automatic adjustment is executed based on the initial values rather than the previous adjustment values.

9) Displaying Coefficients After Adjustment

You can display and check results of some automatic adjustments (FE and RF offset, FZD cancel and F / T / RFAGC) from the test mode. The following coefficients are displayed in each automatic adjustment :

(1) FE and RF offset and FZD cancel

Reference value = 32 (The coefficient of 32 indicates that no adjustment was required).

The results are displayed in multiples of approximately 40 mV.

An example : When FZD cancel coefficient = 35

35 − 32 = 3

3 × 40 mV = 120 mV

Since the corrected value is approximately +120 mV, the FE offset before adjustment was −120 mV.

(2) F and T gain adjustment

Reference value = Focus/Tracking = 20

A coefficient displayed indicates an amount of adjustment conducted on the reference value.

An example : When AGC coefficient = 40

40/20 = Overall gain has bee doubled (+6dB). (The original loop gain of 1/2 has been doubled to have the targeted overall gain.)

(3) RF level adjustment (RFAGC)

Reference value = 8

Coefficient = 9 to 15 ····· The direction in which the RF level is increased (the gain is increased).

Coefficient = 7 to 0 ····· The direction in which the RF level is decreased (the gain is decreased).

Incrementing or decreasing the coefficient by "1" varies the gain by 0.7 to 1dB.

Maximum gain = Typically +6.5dB. Coefficient at this time is 15.

Minimum gain = Typically −6.0dB. Coefficient at this time is 0.

1.4 POWER SUPPLY

The G2 core unit requires the following two lines of external power supply:

[VD 9V]

This is the power supply for mechanical servos. It is applied directly to the driver and used to generate 5V and 3.3V inside the regulator.

[VDD 5V]

This is the power supply for the microcomputer. It is supplied from the main unit when the backup (+B) is connected. The pull-up resistor is connected to SWDVDD, which is obtained through the VDD switching circuit.

There are two GND lines. One is the GND for the servo and digital power supply, and the other is the audio reference AGND. They are produced by separation inside the core unit.

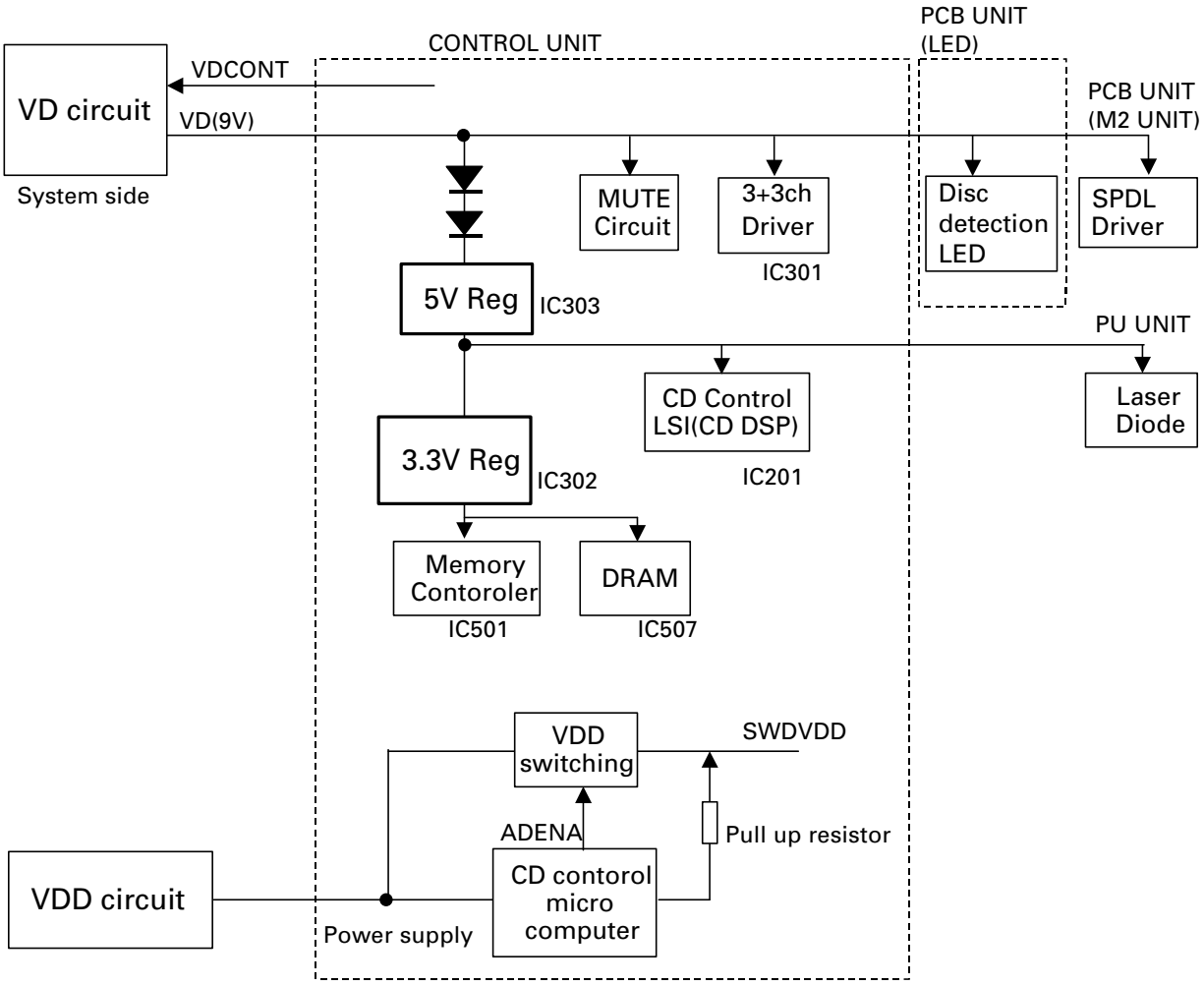
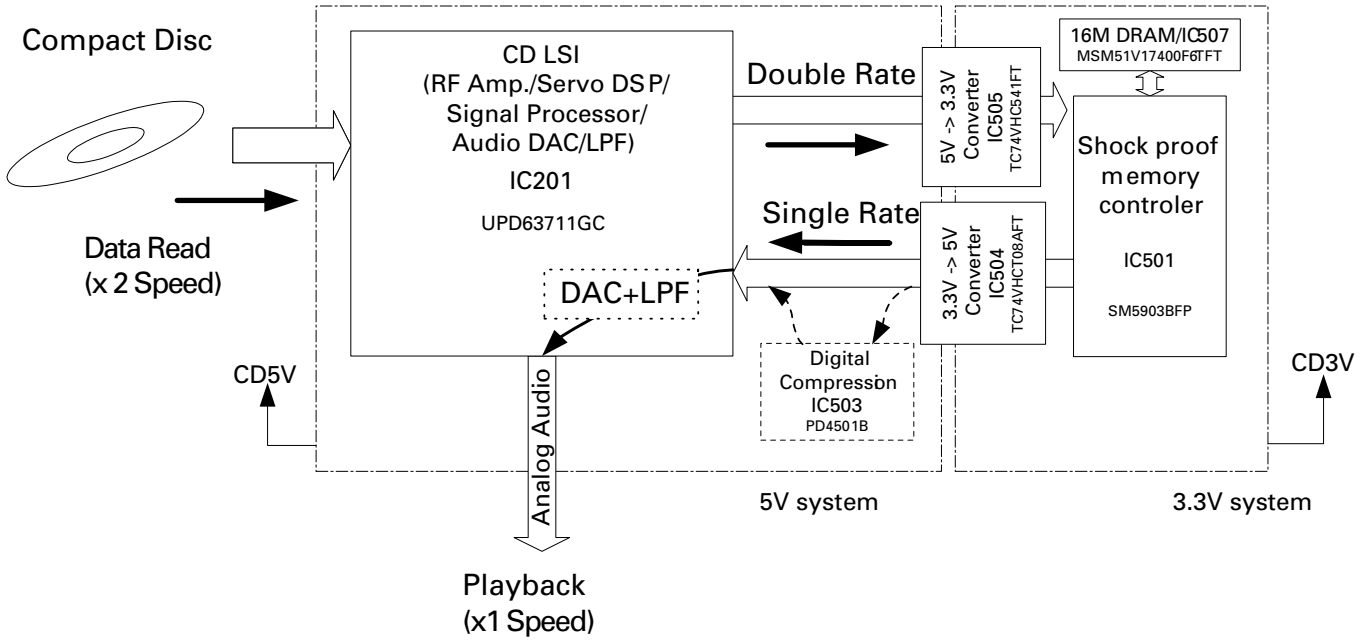


Fig.20 : POWER SUPPLY SECTION

1.5 STS CIRCUIT

Sure Track System (STS) circuit temporarily keeps the audio data read out from a CD in the memory. If the pickup should come off the track, the data recorded in the memory may be output and reproduced. This could help avoid intermittent sound.



Operating principles

The STS circuit is controlled by the shockproof memory controller (SM5903BFP). The audio signal is read out from a CD at X2 speed, demodulated in the CD LSI, and supplied to the shockproof memory controller. This memory controller temporarily memorizes the audio data in the DRAM, reads out the data, and outputs to the DAC at X1 speed using the master clock (MCK: 16.93MHz), which is supplied from the CD LSI, as the reference clock.

The written speed is higher than the DRAM read-out speed. When the DRAM memory becomes full, the controller stops writing the data like in the pause mode, but continues reading out the recorded data from the memory. When some vacant area appears in the memory, the controller starts writing the data again. (The RAM remaining memory is monitored at the STSMO terminal.)

Repeated operations of the above process have realized efficient use of the DRAM and about 10.7-second data memorization. Therefore, even when the pickup should remain on the off-track state for 10 seconds due to external shocks, this STS circuit will reproduce the audio data without intermittent sound.

1.6 Mechanism control section

Outline

The movement of the changer mechanism module is realized by sophisticated combinations of the LOAD/EJECT, ELEVATION, CAMGEAR motor (in the operation mode), and SPDL CLAMP operations.

1) Loading

1.1) Detection control

This mechanism module employs the following three detection systems:

Function	Sensor	Descriptions
LOAD/EJECT detection	Phototransistors (Q1, Q22) and LEDs (D31, D32)	To watch the starting of loading and disc ejection
12-cm disc detection	Two switches (S21, 22)	To sense the disc size
Loading completion	One switch (S41)	

1.2) Drive control

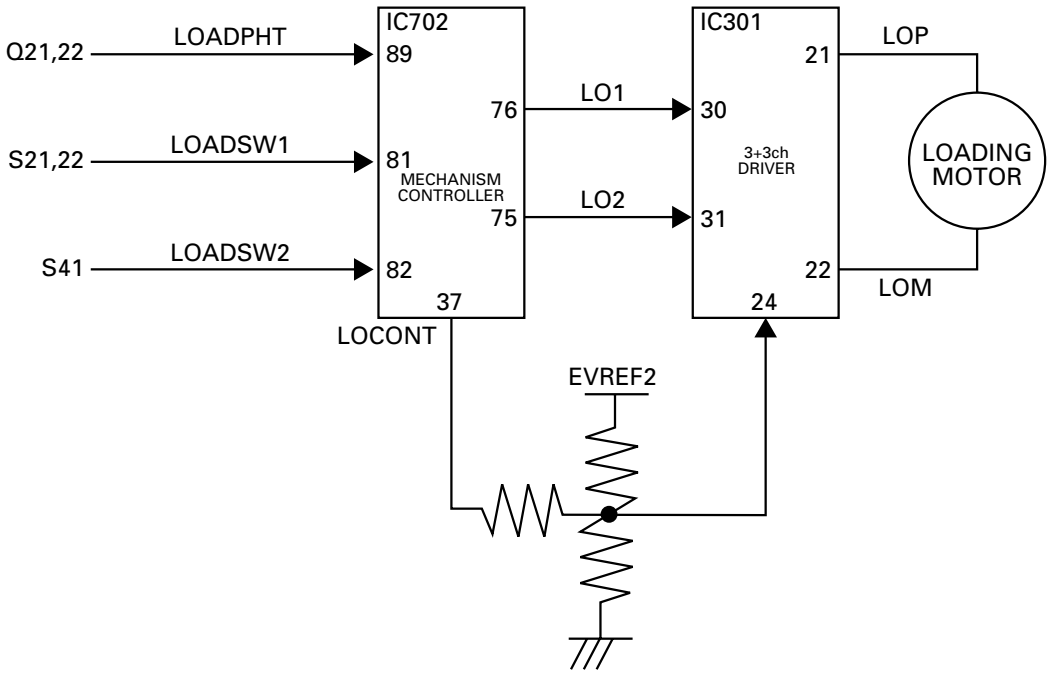
The control unit controls the loading motor to load and eject a disc.

a. Drive circuit

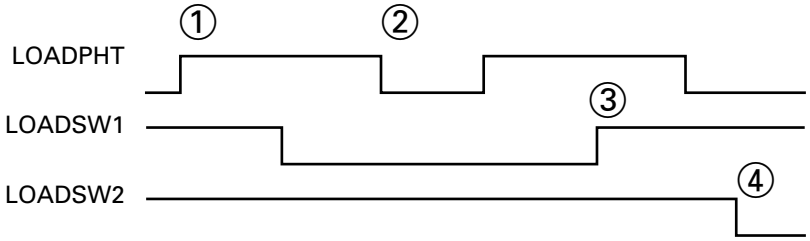
The drive circuit controls the driving direction and the two drive voltages by using the LO1 and LO2, and the LOCONT (H/L) respectively, which are output from the microcomputer (IC702).

In the loading mode: LOP<LOM, LO1; L, LO2; H
In the ejection mode: LOP>LOM, LO1; H, LO2; L

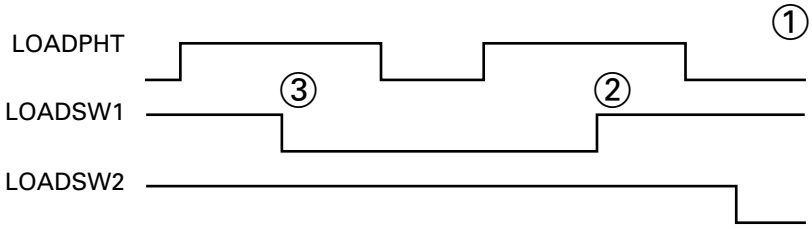
Drive voltages (LOCONT ; H) ; 6.5V
(LOCONT ; L) ; 4.4V



b. Drive control sequence
In the loading:
① When the LOADPHT is turned ON (H), the drive operation starts.
④ When the ON state of the LOADSW2 is sensed, the loading motor stops.

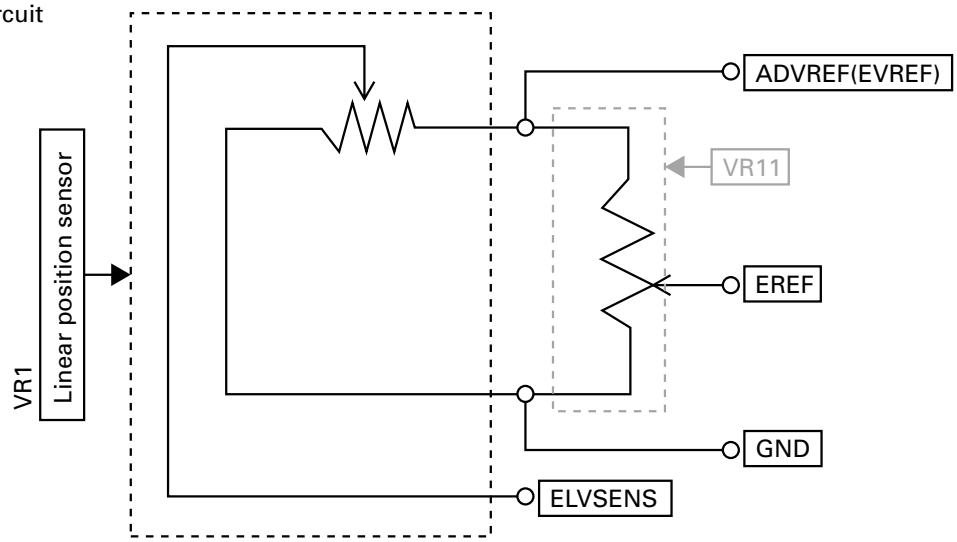


In the ejection mode:
After the loading motor starts moving ①, the OFF state of the LOADSW1 is sensed ③, then the loading motor stops 16msec after the counterelectromotive brake is applied.



2) Elevation
2.1) Detection control
By using the linear position sensor (VR1), the data on the height of the stage chassis is obtained and converted in voltage, then applied to the A/D converter in the microcomputer to detect the absolute position.

Detection circuit



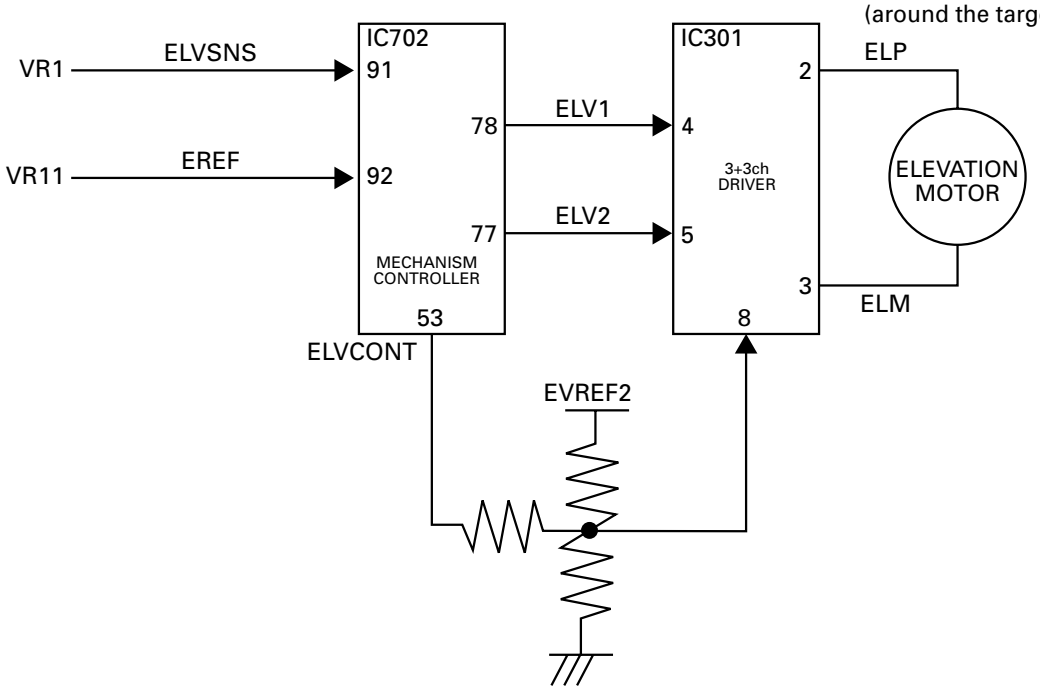
2.2) Drive control
The control unit controls the ELV motor to perform the following operations:
• To open and close the shutter
• To open and close the tray claws (in the loading mode)
• Elevation
• To open the shutter (option)

a. Drive circuit

The drive circuit controls the driving direction and the two drive voltages by using the ELV1 and ELV2, and the ELVCONT (H/L) respectively, which are output from the microcomputer (IC702).

To drive in the UP direction:ELP<ELM, ELV1; H, ELV2; L
To drive in the DOWN direction:
ELP>ELM, ELV1; L, ELV2; H

Drive voltages
(LOCONT: H) 7.4V --- Used in the continuous driving mode
(LOCONT: L) 6.3V --- Used in the pulse drive mode
(around the targetposition)



b. Drive control sequence

(1) The continuous driving mode is kept until the brake starting position.
(2) When it is sensed that the brake starting position is passed, the short brake starts.
(3) The pulse drive operation starts to move the stage toward the OK range. When the stage comes into the OK range and chatter is checked, the operation ends.

3) CAM motor

3.1) Detection control

The three switches CAMEOK (S32), CAMLOAD (S31) and CAMCLMP (S11) detect the following four positions where the CAM operation needs to stop: EOK: Tray changing allowable position LIFT: Load/eject allowable position CLMP: The allowable position to change the used claws from the TRAY claws to the SPDL claws PLAY: PLAY allowable position.

3.2) Drive control

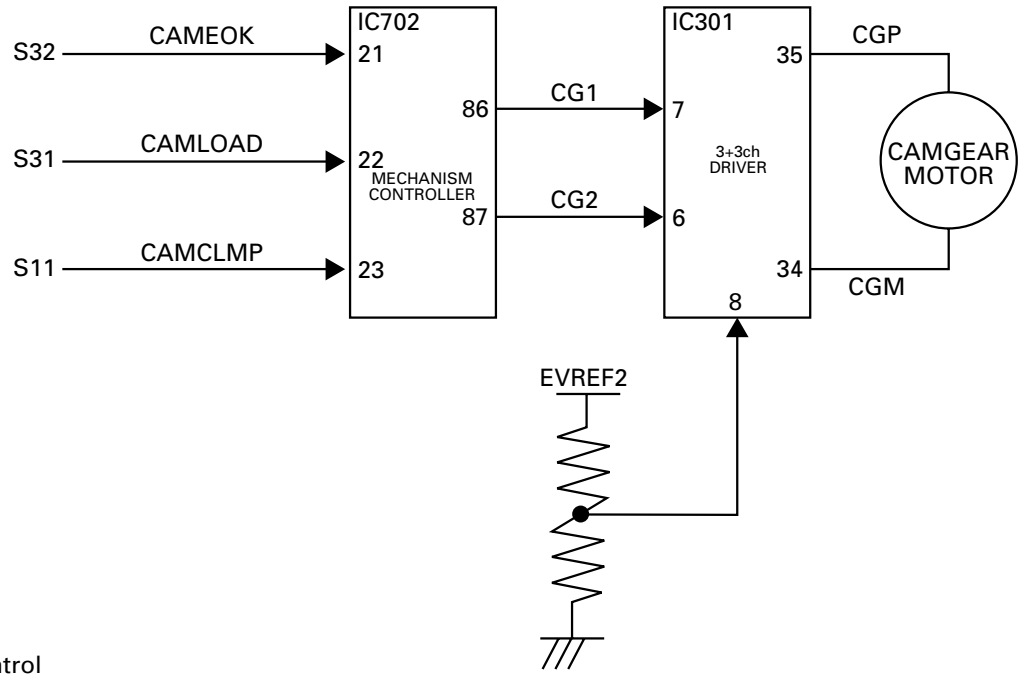
The control unit controls the CAM motor to perform the following operations:

- Trays separation
- CRG chassis rotation (to move to the PLAY position)
- Mechanical lock release
- Tray claws (for disc clamp) open/close (in the PLAY mode)

a. Drive circuit

The drive circuit controls the driving direction by using the CG1 and CG2, which are output from the microcomputer (IC702).

To move the CRG chassis in the outer direction:
CGP<CGM, CG1; H, CG2; L
To move the CRG chassis in the inner direction:
CGP>CGM, CG1; L, CG2; H
Drive voltage: 7.4V fixed



4) SPDL clamp

4.1) Detection control

In the detection circuit, the following two switches are used:

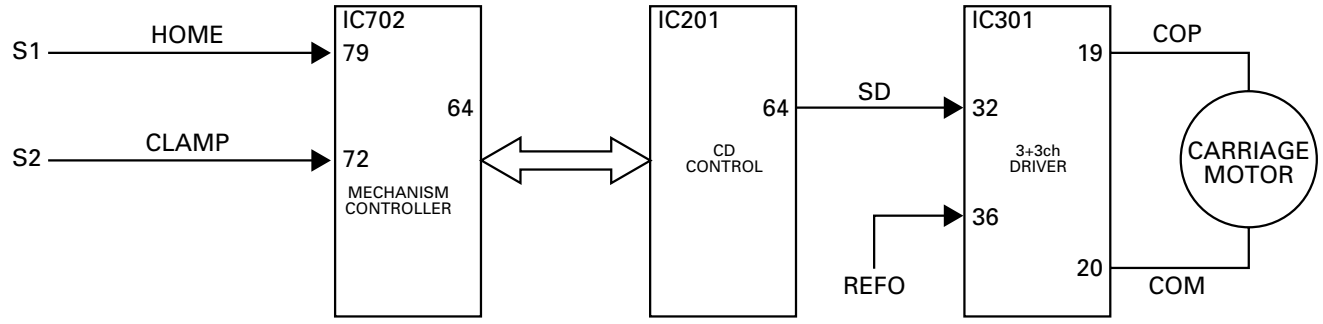
HOME switch (S1) for the servos

CLAMP switch (S2) for claw closing confirmation

4.2) Drive control

The drive circuit moves the CRG toward inner tracks than those for the normal play, and operates the disc clamp mechanism.

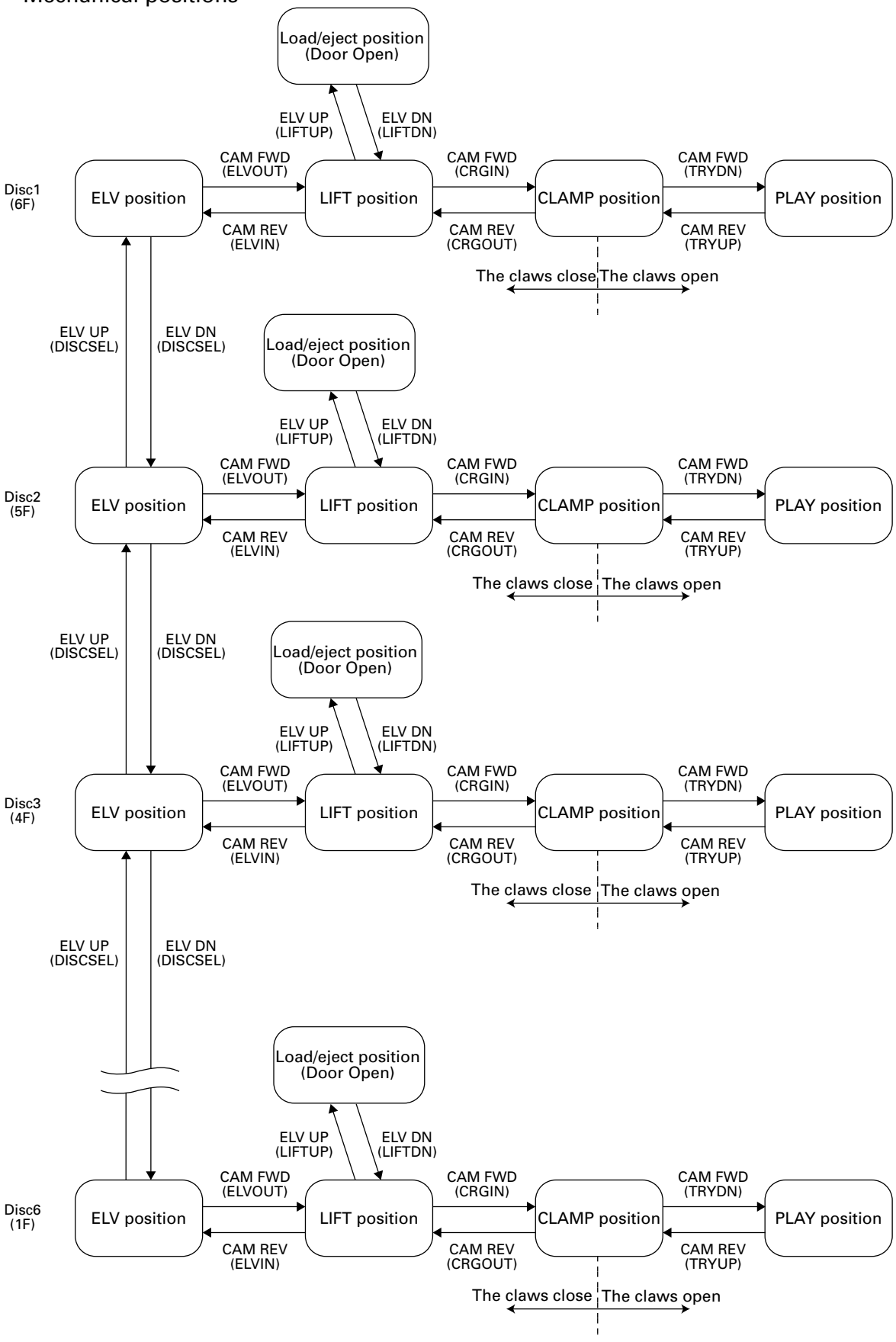
Drive circuit



Claw open (close) drive voltage: 5.0V

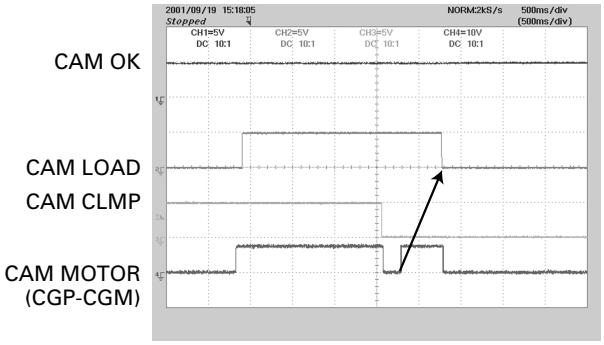
Retry drive voltage: 7.0V

Mechanical positions

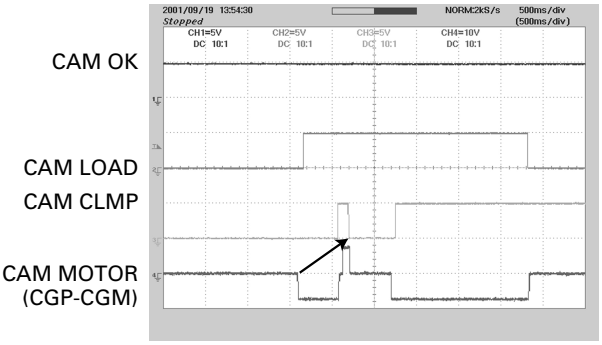


CAM operation

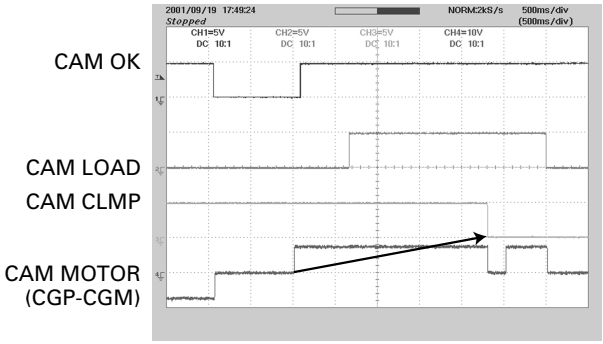
TRYDN
(From CLMP position to PLAY position or CAMLOAD ON)



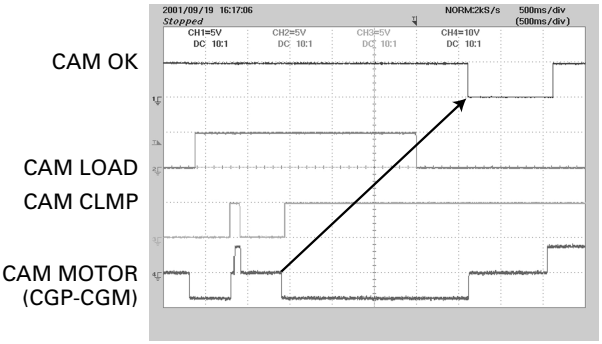
TRYUP
(From PLAY position to CLMP position or CAMCLMP OFF to ON)



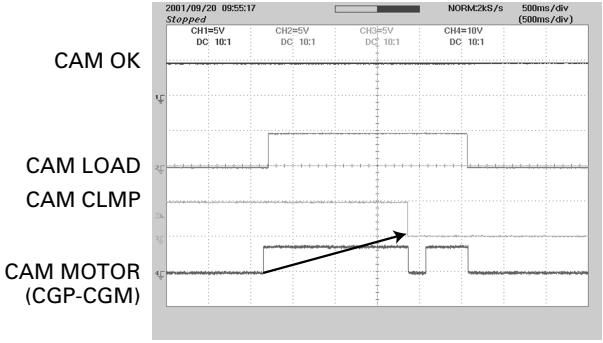
CIN_EXP
(From EOK position to CLMP position or CAMCLMP ON)



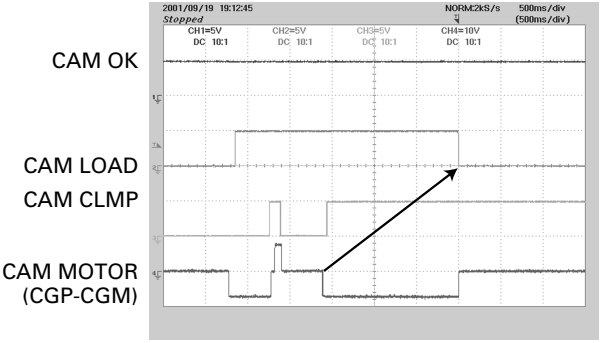
EIN-EXP
(From CLMP position to EOK position or CAMEOK ON)



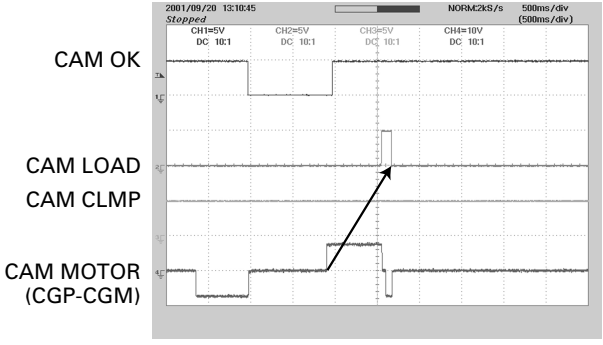
CRGIN
(From LIFT position to CLMP position or CAMCLMP ON)



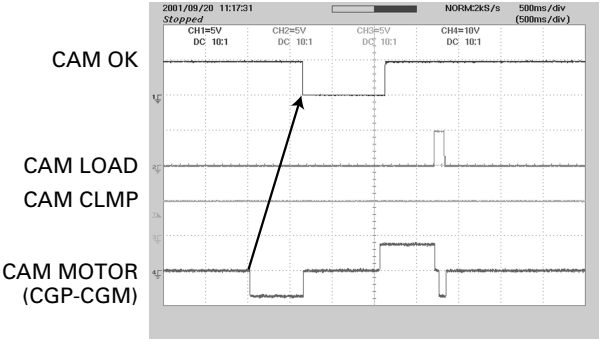
CRGOUT
(From CLMP position to LIFT position or CAMLOAD ON)



ELVOUT
(From EOK position to LIFT position or CAMLOAD OFF to ON)

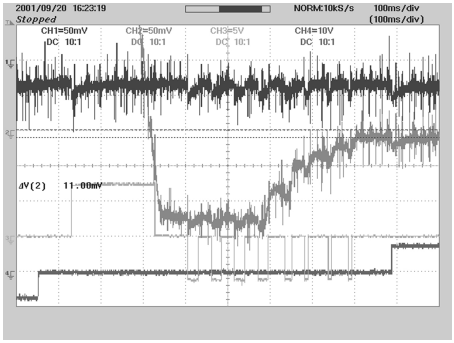


ELVIN
(From LIFT position to EOK position or CAMEOK ON)



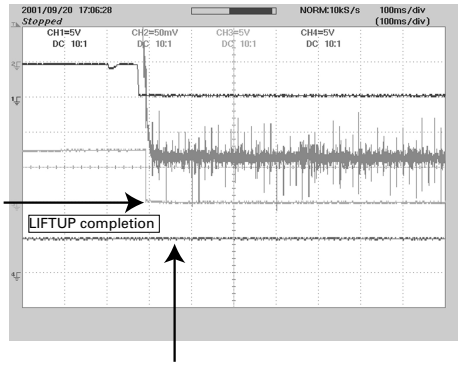
ELV operation

DISCSEL

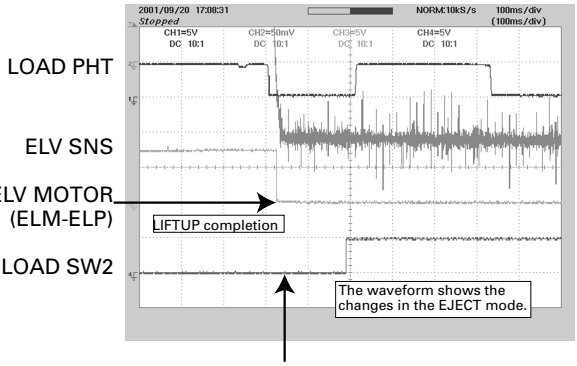


LIFTUP

DISC LOAD (with no disc loaded in a tray)



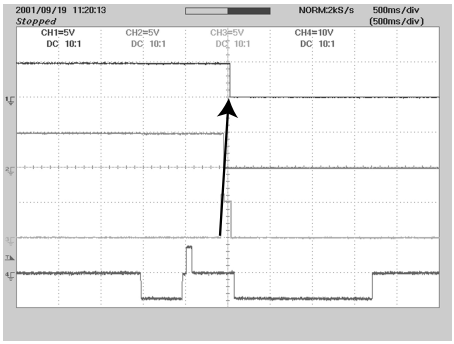
for DISC EJCT(with a disc loaded in a tray)



CLAMP operation

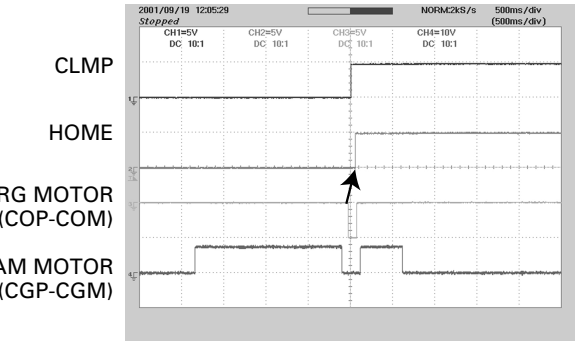
DSKFREE

Until CLMP ON (The drive voltage drops with HOME ON.)



DSKLOCK

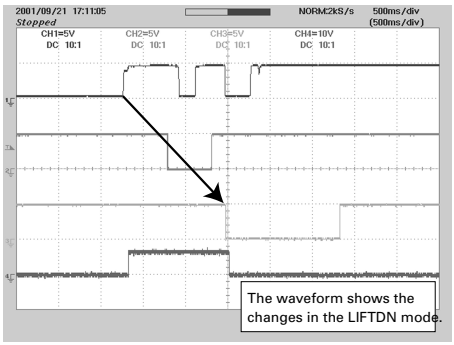
Until HOME OFF



LOAD/EJECT operation

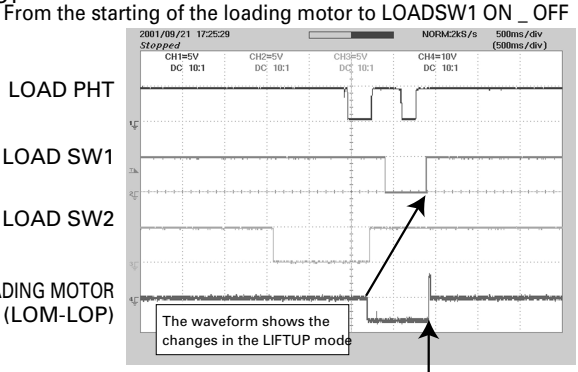
LOAD

From LOADPHT H (disc insertion starts) to LOADSW2 ON



EJCT

From the starting of the loading motor to LOADSW1 ON _ OFF



2. MECHANISM DESCRIPTIONS

1) Initialization

When the power is turned on, the mechanism starts the initializing operation to check on which trays a disc is loaded.

<Initialization operations> (From the transport position)

• The tray holder lock is reset.

• During elevation, it is sensed if or not a disc is loaded on each of the trays from DISC #6 (1F) to DISC #1 in turn with the LOAD3 switch (S41: Load completion SW). (On the whole product, the DISC #1 button is used to select the uppermost floor (6F) tray, which is different from that for the G1-series mechanism.)

• When the above disc sense ends, elevation starts to clamp a disc. If there is no tray with a disc loaded, the mechanism will not proceed to the elevation mode for the disc clamp operation.

• To clamp the loaded disc, the cam gear motor rotates to move the carriage mechanism. (It is the same with no disc loaded.)

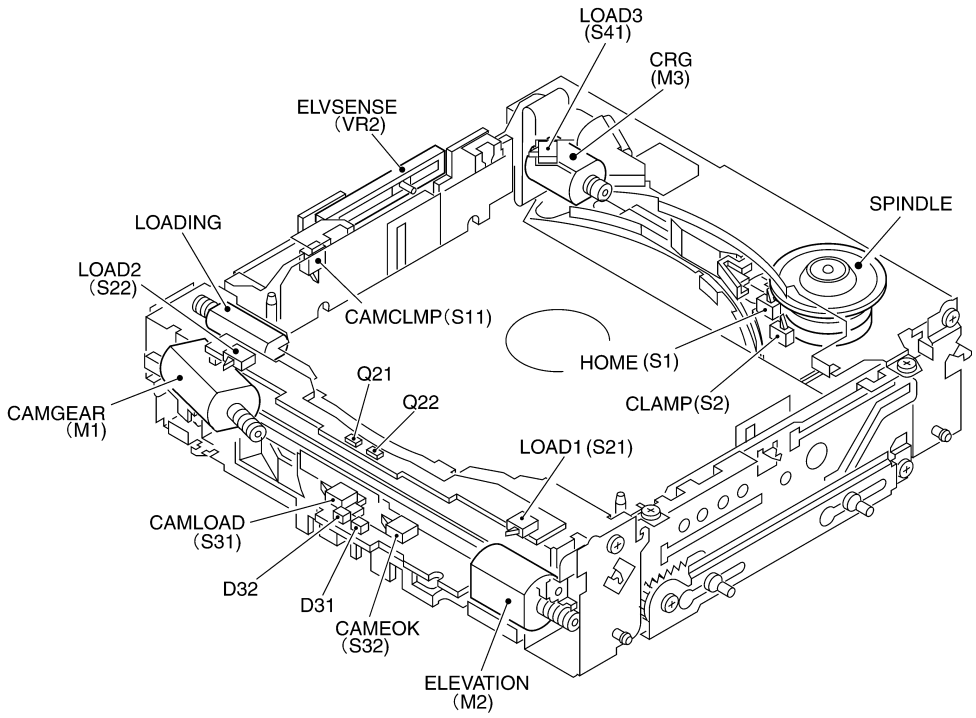
• After the disc is clamped, the mechanism stops.

If the CD source is selected, the spindle motor starts rotating to play the disc.

In other words, when the power is turned on for the first time, the mechanism will get into the quasi-clamping mode for the DISC #1 and stop.

2) Functions of motors, switches and sensors

Loading motor	Disc loading
	Disc ejection
Cam gear motor	Tray separation
	Carriage mechanism assy rotation
	Mechanical lock release
	Tray claws open/close (in the play mode)
Elevation motor	Shutter open/close
	Tray claws open/close (in the loading mode)
	Elevation
	Door open (option)
Carriage motor	Search
	Disc clamp
Spindle motor	Disc rotation



3) Loading

The mechanism has realized the disc detection by employing two switches and two phototransistors mounted on the PCB UNIT (LOAD), and one switch mounted on the PCB UNIT.

a. Switches LOAD1 and LOAD2 (S21, S22) (Signal: LOADSW1)

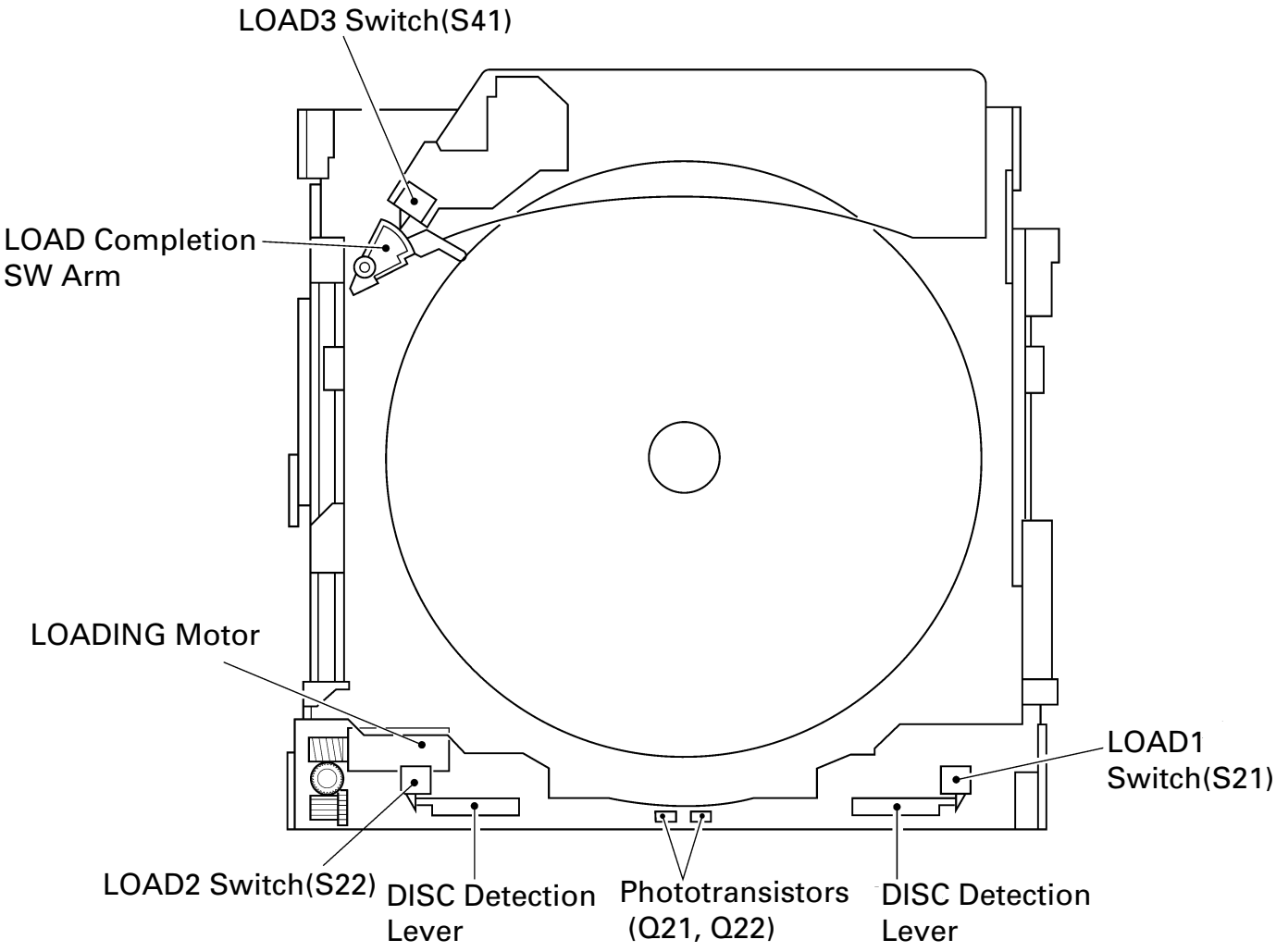
The switches mounted on the PCB UNIT (LOAD) turn on when the left and right DISC detection levers are moved by the loaded disc. These two switches LOAD1 and LOAD2 are connected in series to produce the same signal. Only when both of them turn on, the signal LOADSW1 is switched from high to low.

b. Phototransistors (Q21, Q22) (Signal: LOADPHT)

The phototransistors receive the beams emitted by the LEDs (D31 and D32) and sense if the beams are interrupted. These two phototransistors Q21 and Q22 are connected in series to make the same signal. Only when both of them are covered from the beams, the signal LOADPHT is switched from high to low.

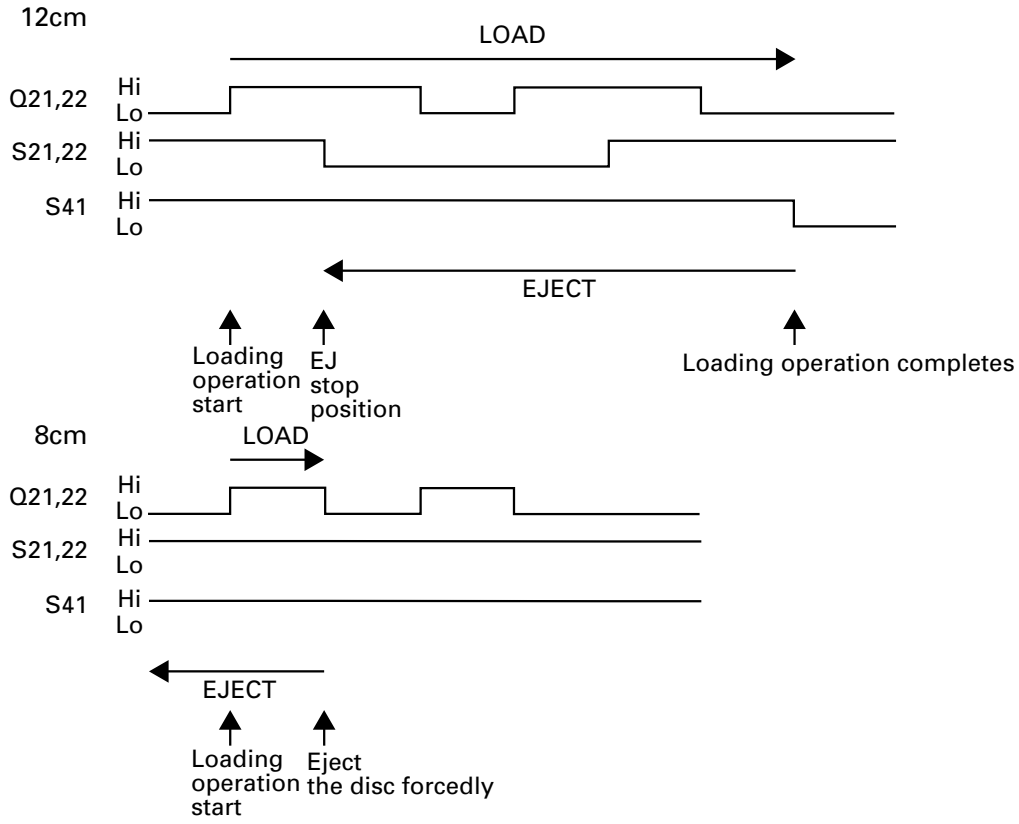
c. Switch LOAD3 (S41) (Signal: LOADSW2)

When the loaded disc reaches the stop position, the switch S41 (mounted on the PCB UNIT) is pushed by the LOAD completion SW arm on the stage. This switch detects discs in the initializing mode, and senses that the disc is inserted into the bottom.



<Loading operations>
When the disc covers the phototransistors and the LOADPHT signal is switched from high to low, the loading motor rotates in the disc draw-in direction. Then the mechanism continues drawing in the disc watching the signal from the phototransistors. When the signal is switched from low to high (or around the center hole of a 12cm disc), the mechanism confirms that the signal from the switches LOAD1 and LOAD2 has been switched from high to low. If the signal remains high, the mechanism will eject the disc forcedly. Only when the signal has been switched to low, the disc draw-in operation continues.
The disc pushes the LOAD completion SW arm, the LOAD3 switch turns on, and the LOADSW2 signal switches from high to low. Then the loading operation completes.

<Eject operations>
After the eject operation starts, the signal from the switches LOAD1 and LOAD2 changes from high to low, then returns to high. At this moment, the mechanism uses the brake function to stop the loading motor.

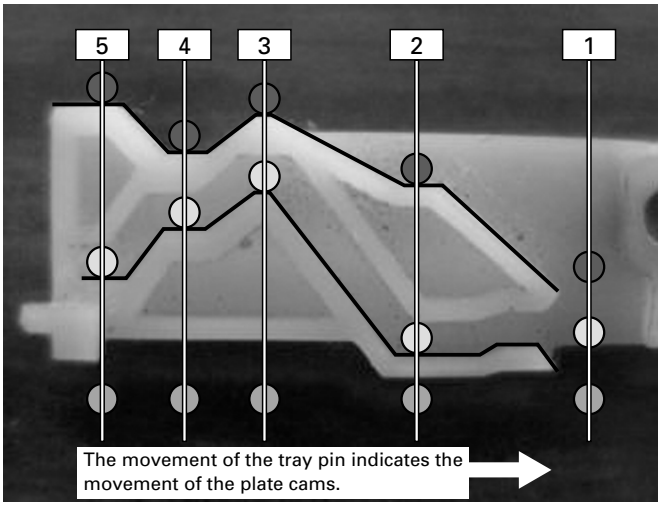


4) Cam gear motor
a. Tray clamp (tray separation) mechanism
There are the following five positions in the tray height (separation) states:
1. (Tray free) ELVok: The plate cams do not clamp the tray.
2. (Clamp) Load: The plate cams clamp the tray at the loading position
3. (Clamp) CRGIN: The plate cams clamp the tray at the position where the carriage moves in. (The upper dead point)
4. (Clamp) Disc clamp: The plate cams clamp the tray at the position where a loaded disc can be clamped (or a loaded disc on the tray stays on the support wheel).
5. (Clamp) Play: The plate cams clamp the tray at the disc play position (where there is some clearance under the disc).

<Tray separation driving principles> for real operations
The right and left plate cams with cam grooves synchronize the back and forth movement to change the height of the tray.One plate cam has two grooves, one is in the front side, and the other is in the rear side. The front and rear grooves have the same shape except for the load portion.
These plate cams are fixed on the left and right sides of the stage chassis. To minimize the height of the plate cams, the cam grooves in the stage are used. A sophisticated combination of a plate cam groove and a stage groove realizes the tray's movement in the up and down direction.

<Tray separation driving principles> for driving power
The driving power comes from the cam gear motor. The torque decelerated by the gears is transferred to the cam gear. The cam gear has four grooves. One of them is to drive the tray clamper lever. In accordance with this cam groove, the tray clamper lever moves back and forth. There are two long grooves at the tray clamper lever's ends. The plate cam's shafts are engaged with these grooves. Therefore, The tray clamp lever's movement in the back and forth direction is transferred to the plate cams by these grooves and the shafts.

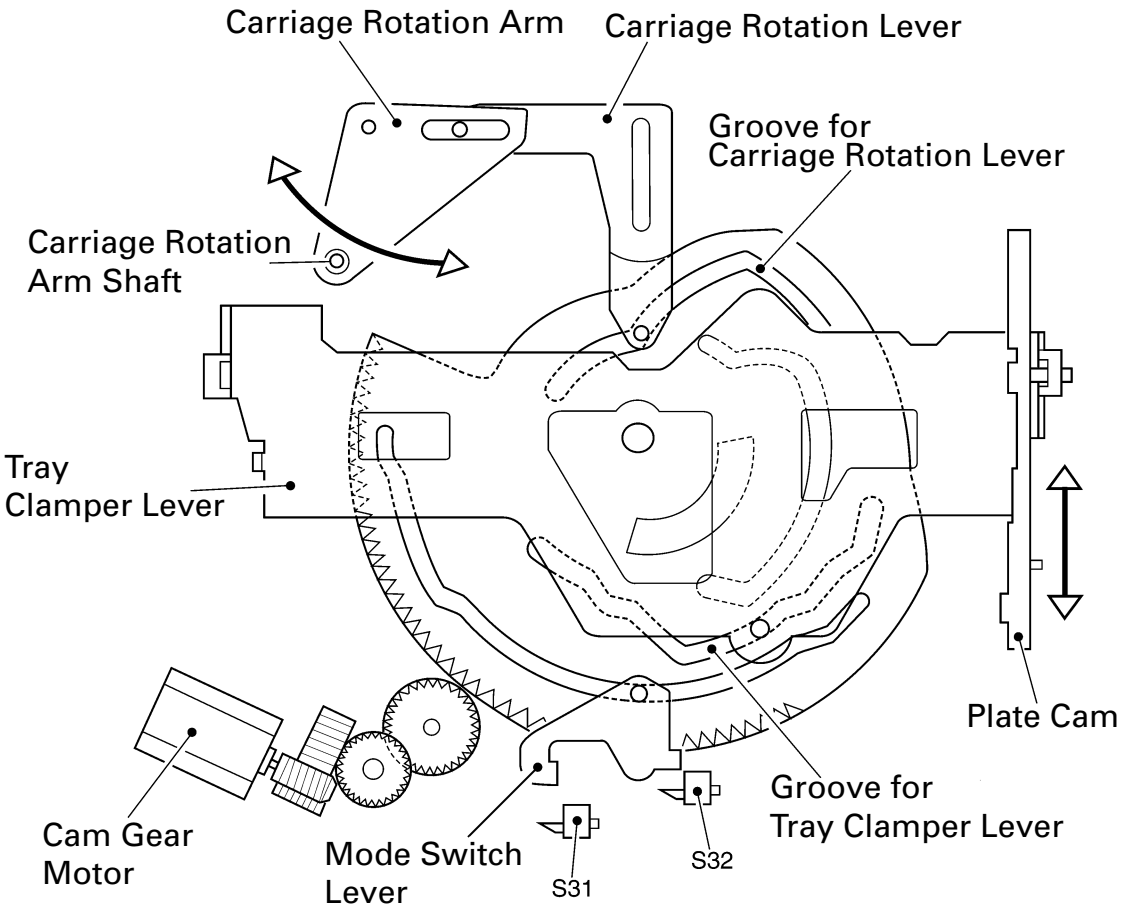
The position of the tray pin above the plate cam changes as shown below:



:The pin of the tray right above the plate cam:
It moves up and down together with the plate cam.

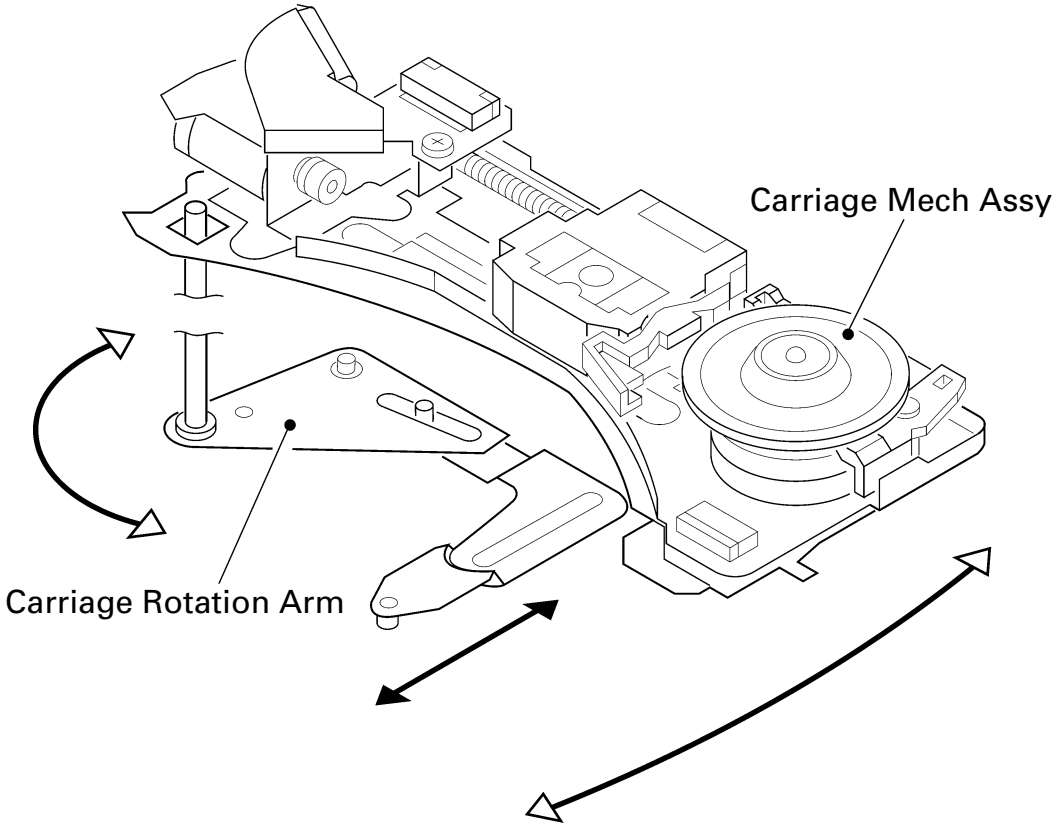
:The pin of the target tray:
It moves up and down together with the plate cam.

:For the pin of the tray right under the plate cam:
The above figure is just for reference.
The plate cam moves up and down for itself.



b. Carriage mech assy rotation mechanism

The carriage mech assy rotation mechanism is to move the carriage mech assy into the disc area for disc reproduction. The driving power from the cam gear is transferred to the carriage rotation lever (as sliding movement), then to the carriage rotation arm (as rotation).



5) Elevation motor

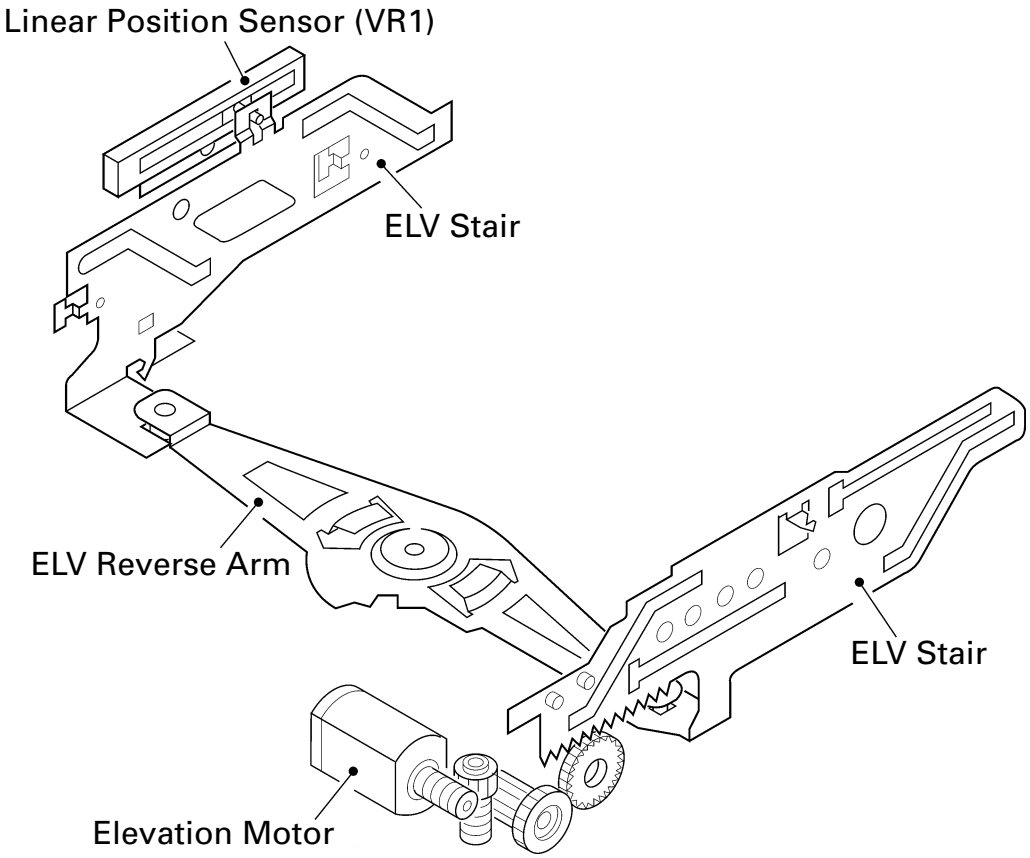
The elevation motor is used for the following two operations:

1. Elevation up and down
2. Shutter open and close (to move roller and disc guide, and to open or close the tray claws)

a. The elevation motor rotation slides the ELV stair slides via the gears.

b. The ELV reverse arm (located on the mechanism bottom side) synchronizes the left and right ELV stairs.

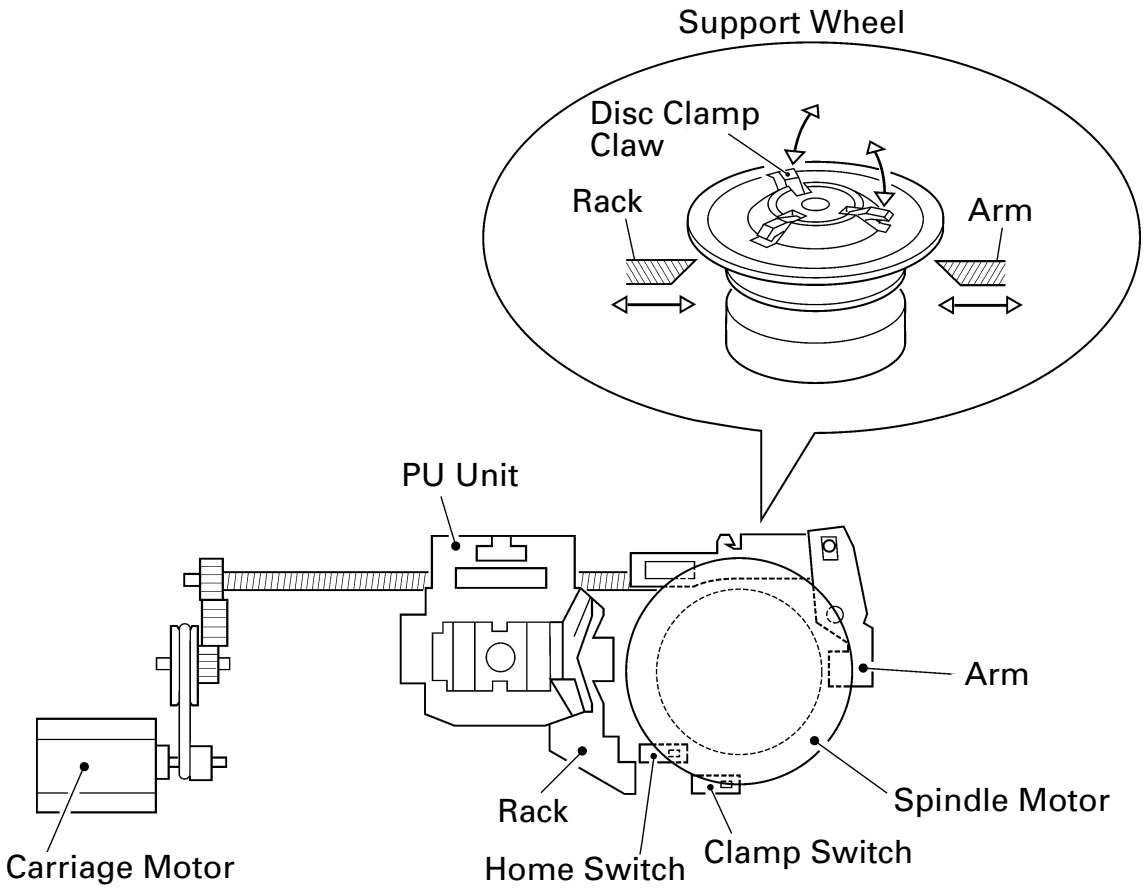
c. The linear position sensor (VR1) detects the height of the elevation.



6) Carriage motor

The carriage motor torque decelerated by the first belt is transferred via some gears. The last gear is engaged with the gear inserted into the feed screw. The feed screw is engaged with the rack of the PU unit, which moves the PU unit at last.

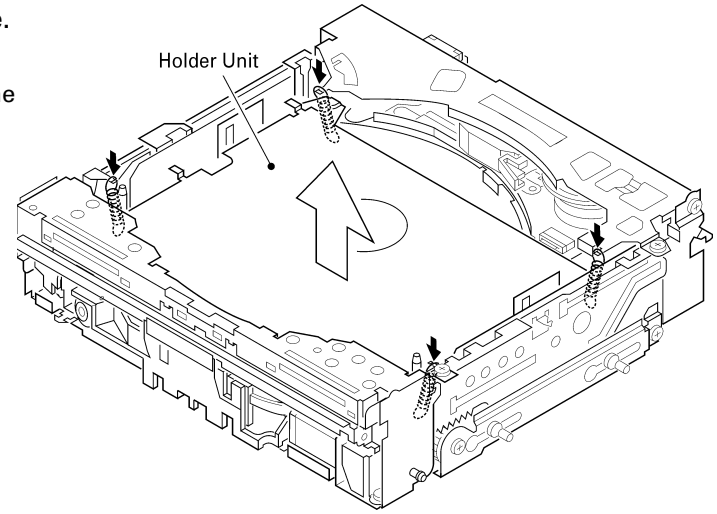
When the PU unit moves to inner tracks than the home position, the disc clamp claws start to close. When the claws are open, the plate of the spindle motor support wheel is pressing the claws to hold them in the open position. When the PU rack and the arm move to close the claws, the plate will be lowered and the claws will be set inside the support wheel. This is the disc clamp claw close mode.


Support Wheel
Disc Clamp Claw
Rack
Arm
PU Unit
Arm
Spindle Motor
Rack
Clamp Switch
Home Switch
Carriage Motor

3. DISASSEMBLY

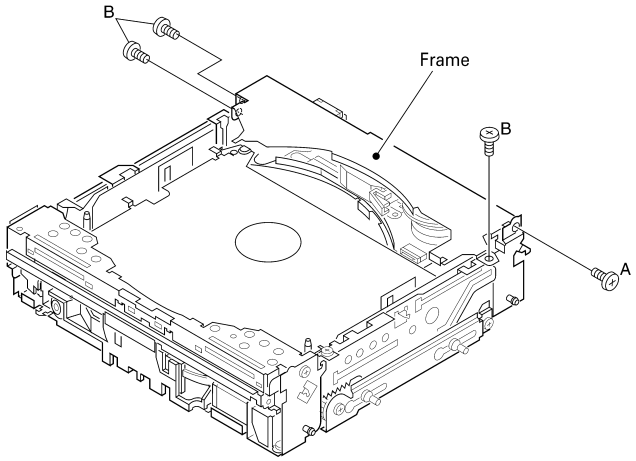
● Removing the Holder Unit

1. Set the whole mechanism to the loading mode.
2. Unhook the four springs of the Holder Unit and temporarily hook them at the frames as shown in the right figure.
3. Lift up the Holder Unit straight and remove it.

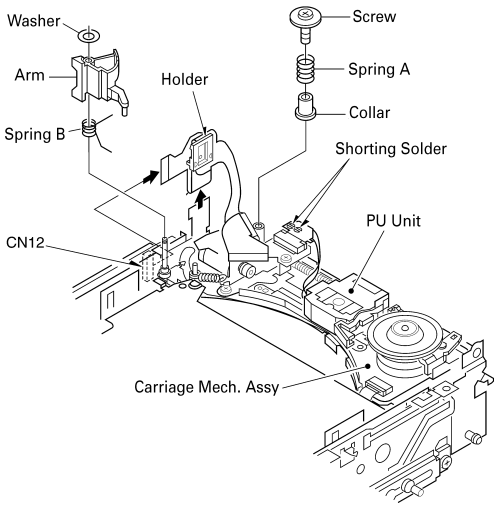


● Removing the PU Unit(PX1)

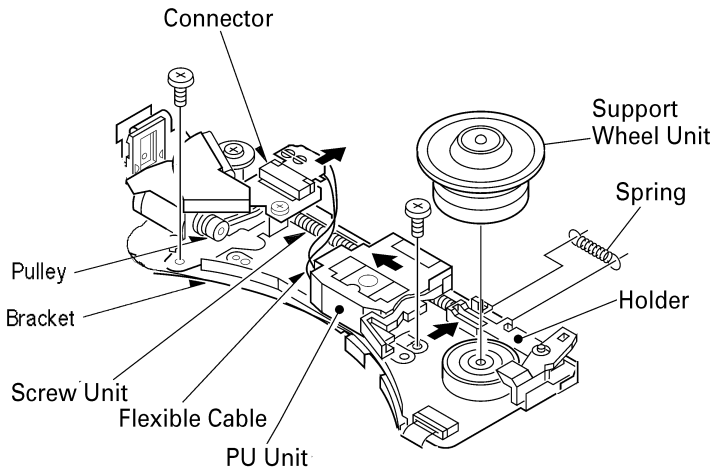
1. Set the mechanism to the shipment mode.
2. Remove the two screws A and two screws B.
3. Remove the Frame.



4. Apply shorting solder to the PU flexible cable before disconnecting it from the connector CN12.
5. Disconnect the flexible cable from the connector CN12, and remove the flexible cable Holder.
6. Remove the washer and Arm. (Be careful not to lose the spring B.)
7. Remove the screw, spring A, and Collar.
8. Remove the Carriage Mech. Assy.

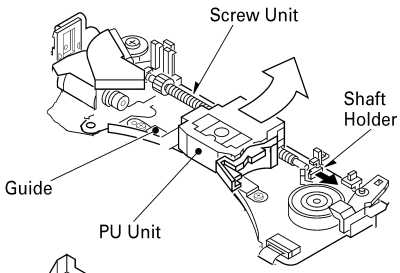


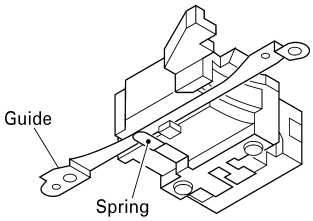
9. Apply shorting solder to the PU flexible cable before disconnecting it from the Connector.
10. Disconnect the PU flexible cable from the Connector.
11. Move the PU Unit to the left side slightly by turning the Gear.
12. Pull out the spindle motor Support Wheel Unit upwards to remove it.
13. Remove the Spring.
14. Slide the holder to make it easier to remove the Screw Unit.



15. While pressing the shaft holder in the direction shown by the black arrow in the right figure, remove the PU Unit together with the Screw Unit.

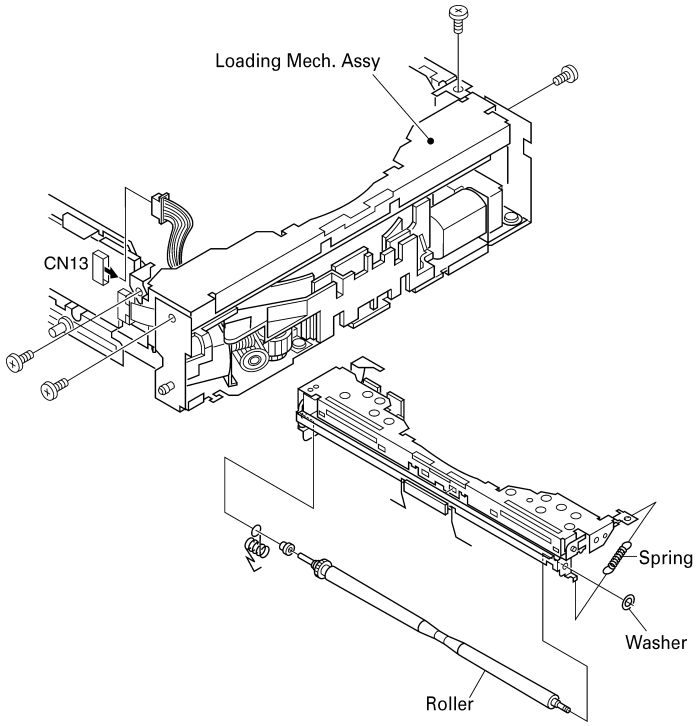
Note:
To assemble the PU Unit, insert the Spring on the PU rear between the PU Unit and the Guide first.



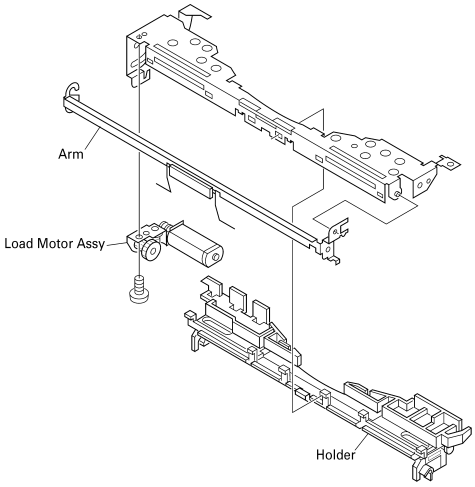


● Removing the Load Motor Assy

1. Remove the four screws.
2. Disconnect the Load Motor connector from the connector CN13.
3. Remove the Loading Mech. Assy.
4. Remove the washer and spring.
5. Remove the Roller.



6. Remove the Arm and Holder.
7. Remove the screw and Load Motor Assy.



● Removing the Cam Motor Assy and ELV Motor Assy

1. Remove the connector from the Connector CN14.
2. Remove the Cover.
3. Remove the screw A and the Cam Motor Assy.
4. Remove the screw B and the ELV Motor Assy.